HIGHER EDUCATION AND EARNINGS IN THE UNITED STATES AND JAPAN

By

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CHAPTER I

STATEMENT OF THE PROBLEM

The inability of college and university graduates to find jobs or jobs commensurate with their training is a growing problem in many of the world's industrial countries. According to the Chronicle of Higher Education (1976, Vol. 7), the French university system is sometimes called "the unemployment machine." Many of the country's 760,000 university students drop out before completing their courses. For those who do earn degrees, jobs have become increasingly difficult to find. One estimate indicated that half of the university graduates in recent years had been unable to find jobs.

Sweden, after eight years of planning and debate, had adopted a series of reforms that will, among other things, adapt access to higher education and training available for students to future manpower needs. The Swedish proposal took form in part because of widespread unemployment among university graduates in the early 1970s.

Higher education in Japan played an important part in helping the Japanese to transform the nation from a developing country into the modern state it is today. In Japan, institutions of higher education are broadly classified into three types: colleges and universities, junior colleges, and technical colleges. Colleges and universities number about 400, of which 200 have graduate schools. Junior colleges, which number 500, offer two- or three-year programs. The rate of

graduation among college age population following such advanced courses in 1975 was 34 percent (Statistical Handbook of Japan, 1977), but these college and university graduates have been facing difficulties in finding jobs adequately matched with their training in recent years.

Whether the under-employment of highly educated graduates in Japan is a short-term phenomenon linked to the worldwide recession of the early 1970s or is due to a shift in the need for trained manpower, is a question hotly debated but unresolved.

In the United States, concerns over unemployment and under-employment of college and university graduates has been voiced for several years. According to Richard B. Freeman (1976), the under-employment of university graduates in the United States will continue until at least the mid-1980s, when the number of college-age people in the population will drop. He found the college job market underwent an unprecedented downturn at the outset of the 1970s. Earnings of new graduates dropped, while employment prospects and occupational attainment diminished, and large numbers of new college graduates were forced into jobs previously considered beneath them. Overall, Freeman found that college may be eminently worthwhile for non-economic reasons but that when it is viewed as an investment in generating future income, it no longer pays off very well. He warned that the economic position of new male college graduates is likely to remain depressed through the end of the 1970s, but will improve moderately in the early 1980s and rapidly in the late 1980s, though not to the boom conditions of the 1960s. The improvements, however, will result from reduced supplies of holders of bachelor's degrees due to declining college enrollments.

Regardless of whether the current problems of under-employment and

unemployment among university graduates is a cyclical or a permanent phenomenon, it has raised serious questions about the role of systems of higher education in virtually every country where it has appeared.

Purpose of the Study

College education has traditionally been a major route for social and economic advance in the United States and Japan, providing individuals with training that promised high earnings, and providing the nation with scientific and technical specialists and skilled white-collar workers. College graduates have had a preferred place in the job market, more interesting and prestigious jobs, higher incomes, with less unemployment than the general population. Viewed as an economic investment in skills, college training has been highly profitable to individuals and to society, and it has also been an integral part of the people's dream of success and the good life. Economic analysis of higher education supported the notion that more is better. The human capital school initiated by Schultz (1963) and Becker (1964) found that, treated as an investment, education had a substantial payoff. Indeed, despite the increased supply of college educated workers for both countries, the rate of return on investment in college education remained high compared with other potential investments of national and private resources. In short, there was a general consensus among policy makers and analysts, supported by available data, that college training was a fruitful economic investment both to the individual and to society.

In recent years, however, a very different picture of the college worker in the labor market seems to emerge for both countries for the first time since the depression of the 1930s. New college graduates

have had difficulty in obtaining college-level jobs because of deteriorated job market conditions. For prospective school teachers, primarily female, jobs in elementary and secondary schools were especially scarce. Doctoral graduates face less severe but still substantial problems of a collapsing academic job market. In some graduate areas, such as physics or English, the situation deterioriated, at least in some years, to virtual crisis proportions.

Therefore, the questions began to be raised concerning the economic value of the college degree. This research had the purpose of investigating the economic value of a college education in the form of earnings return to the investment in college education, focusing on the following: First, the earnings structure of college graduates in the United States and Japan was investigated, then differences between them were compared. A further investigation was made to find changes in earnings structure of college graduates in Japan between 1970 and 1977 in order to estimate the approximate percentage of under-employed college graduates in 1977.

Need of the Study

The severity of finding jobs for college graduates adequately matched with their training varies from students field to field, institution to institution, and the actual extent of unemployment or underemployment among graduates is difficult to establish. Nonetheless, in the past several years, events in the United States and Japan where either nation classified as a highly developed country and contribution of higher education to every aspect of social life were highly acknowledged facts historically, indicate that the problem is a source of

concern for the college faculties and administrators and also for students. Therefore, there is a need to investigate the economic value of higher education. This study focuses on the examination of the earning advantages for college graduates, comparing with other groups such as junior high or senior high school graduates in the United States and Japan.

The study covers three subjects: the earnings return to investment in college education in the United States and Japan, earnings return to experience among general occupational categories, and the role of college education and of work experience in determining the observed distribution of labor market earnings at different points in the working lifetime in Japan. However, this is not to say that the only impact of human capital or of its college education component is on observed market earnings and returns. Many could argue that the most significant impact of college education is not on earnings at all, but on such diverse and diffuse variables as social and community behavior and responsiveness, efficiency in achieving welfare objectives within given financial constraints, and the development of constructive and cohesive attitudes.

Higher education apparently tends to enhance decision-making generally. The probable explanation is that college education increases information-processing skills. Thus, in a world in which technical change is rapid and new situations are continually emerging, formal schooling yields a substantial benefit in enhancing the problem-solving capacity of those being educated.

Limitation of the Study

Due to the difficulty of collecting data on female college graduates in the job market, the analysis was confined to male college graduates only. The male-female segmentation, an interesting aspect of labor market stratification, was therefore omitted. In addition, other potential determinant variables such as mental ability and quality of school which may affect individual earnings capacity were omitted due to difficulty of collecting data. The Japanese data were obtained from the Basic Survey on Wage Structure, which was available up to 1977. But there was a limitation of availability for the American data. Data from the United States Bureau of the Census was available only up to 1970. Therefore, the comparative study between the United States and Japan was accomplished using 1970 data for both countries. The investigation which focused on earnings change of college graduates using 1970 and 1977 data was done for Japan only.

CHAPTER II

REVIEW OF THE LITERATURE

Historically, the labor market has not been a continuing source of concern for higher education. Except in times of depression, it has absorbed all of the college and university graduates. It has been taken for granted as a generally adequate outlet for talent highly trained academically. This has now changed, and may have changed for the foreseeable future; the labor market is now a serious concern for higher education and is likely to remain so.

Recently, there has been a lively and rapidly growing interest in the economic value of education. This was a new field in the sense that several recent studies were based on the human capital approach. The economic value of education depends primarily on the demand for and the supply of schooling approached as an investment. A number of challenging studies have been done on the economic components of education. Although the findings are still subject to revision as methods of analysis and data are improved, it already is worthwhile to take stock.

Following the fundamental work of Schultz (1963), Becker (1964), and Mincer (1970), which established both theoretically and empirically the concept of expenditures for education, health, etc., as investments in human capital, there were great outpourings of statistical studies and analyses of income-generating functions, including measures suggested by the human capital approach. These studies focused on the

relationship between years of schooling completed and other variables which may have affected the relationship, such as abilities, family background, and quality of schools attended, motivation, geographic difference, race, and sex.

Education

As with interest in the immediate effects of higher education, studies of the relationship between educational inputs and long-range outputs such as income or occupational status, are not recently defined phenomena. Bridgeman (1930) attempted to explain the success, defined as salary adjusted for number of years of experience, of the American Telephone and Telegraph Company employers by their experiences in college. In general, he concluded that rank in class, campus achievements, and early graduations, in that order, are significant indices of success in the Bell system. He acknowledged that he had no control for individual ability.

Hunt (1963) has done a very impressive study. His data were collected by Time Survey, drawn from alumni records of nearly all of the 4-year colleges and universities in the United States, and including graduates of all ages. He used multivariate regression analyses to explain income of graduates by a constructed measure of ability from grades in college, extracurricular activities, socio-economic background variables, years elapsed since graduation, and some purported measures of college quality, such as number of students enrolled, and expenditures per student. He found that the relationship between income and ability, experience, and size of college were significant, but less support was found for the argument that prestige of the college affects

income with individual student ability was controlled. Expenditures per student was a positive but relatively weak determinant of individual income.

Most of these studies of income changes had found income gains resulting from college to increase with ability, although the pattern was not as strong as the "ability liturgy" would lead one to believe.

Using 1949 census data, Becker (1964) estimated the overall rate of return of a college education to be approximately 13 percent, with approximately one quarter of this return (3 percent) based on the ability difference between college enrolees and non-enrolees. A differential subsidy on the order of 1:1.3 between upper- and lower-ability groups might be justified.

Hanoch (1965), based on the 1960 census data, showed the income effect of education, especially higher education, to be sizeable. If the other variables were held constant, he found the annual earning effect on completing college to be between $2,857 and $1,886.

Concerning the effects of college quality on earnings, Hunt (1964) reported that after adjustments for some other factors, graduates of more expensive colleges and universities earn about 50 percent more than did graduates of less expensive institutions.

Weisbrod and Karpoff (1968), reviewing the analysis of earnings of college graduates employed by the American Telephone and Telegraph Company, also found earnings to be related to college quality. Within all of the four categories, top 10 percent, remainder of the top third, middle third, and bottom third--the relationship was clear. Graduates of better colleges earned more. Significantly, there were also differences in the variance of earnings associated with both student ability

and college quality. The difference in earnings was larger for students who finished toward the top of their class than for those toward the bottom, and the differences were larger in colleges of higher quality than in those of less distinction.

Deneve and Mechling (1970) found a similar relationship between student ability and college quality. They used instruction cost per student as their measure of college quality and verbal scores in the Scholastic Aptitude Test as measures of student ability. Discounted lifetime earnings varied regularly with differences in both ability and college quality. On the ability scale, the differences grew larger toward the top. For all students, regardless of the college attended, the difference between the top 1.5 percent and the next 8.5 percent was nearly as great as the difference between the bottom quarter and the group between the 70th and 90th percentiles.

Taubman and Wales (1972) analyzed the relationship between attainment of higher education, mental ability, and earnings. They estimated earnings functions for two points in the individual's life cycle 14 years apart, testing for interactions among ability, school quality, and years attended, also looking for biases in the coefficient on years of schooling when ability was omitted. They alleged that mathematical ability, not IQ, was as important as education in explaining the range of earnings. The bias, when ability was omitted, was about 30-35 percent at various education levels for mathematical ability, and only nine percent for other types of mental ability. They also took a brief look at the effects of the quality of schooling using a subjective academic rating known as the Fourman Index. At the "same college" and "BA" level, only the highest quality fifth affects earnings

significantly for graduates. This was true for the top two undergraduate schools fifth and the top graduate school fifth. Differences in income at a given educational level attributable to college quality effects appeared to be very large.

Family Background

The effect of family background factors on income has also been studies. The hypothesis that children of wealthier parents have greater earning potential than those from poor parents has been tested in several studies. There are four possible reasons for this. First, there may be a desire by society to maintain the social structure. Second, there may be discrimination by employers who prefer employing children from wealthier families. Third, wealthier parents buy more schooling for their children because they know the rules of the game--that schooling is used as a screen or because it is a consumer good with a positive income elasticity of demand. Fourth, children of wealthier families could enjoy inherited wealth of parents.

Concerning the father's occupation effect on the son's educational attainment and earnings, Wolfe and Smith (1956) found that this variable is of little significance. Among those who attained any particular academic level, there is little relation between the father's occupation and the percentage of the sample in the professions. Within each educational group, however, the sons of professional men have larger incomes than do the sons of other men. They also found that college graduates are much more likely to be professionals than those who are not graduates.

Taubman and Wales (1970) found that among a large group of World

War II Air Force officers whose fathers had progressed at least as far as the ninth grade earned about $300 a year more in 1955 and about $1,200 a year more in 1969 than did those whose fathers had not entered high school.

Blau and Duncan (1971) attempted to find the difference in occupational status by well conceived measures of family background (socioeconomic status), individual ability, and years of schooling. Their model began with two variables describing the early stratification position of each person, his father's educational and occupational attainment status. It then moved to two behavior variables--educational level of the individual and the prestige level of his first job. The dependent variable was the person's occupational prestige position, somewhat correlated to individual income. The model accounted for about 26 percent of the variance in educational attainment, 33 percent of the variance in the first job, and 42 percent of the variance in the 1962 level of occupational attainments.

Reed and Miller (1972) found that after they took account of age, race, college quality, and field of specialization without consideration of ability, there was essentially no discernible influence due to the father's education or occupation on the earnings of college graduates.

The strength of the effect of the child's income due to the mother's schooling was shown a decade ago by Haunt (1963). He was interested in the determinants of the earnings of male college graduates, and he had data on the individual's schooling and the schooling of his father and mother. The effect of the mother's schooling was positive and statistically significant, while that of the father was

positive but had a lower slope and was not significant.

Ability

It is well known that higher earnings are attributable only partly to higher education as such, for a portion of the earnings difference should be credited to ability, motivation, and other factors that differentiate young people who graduate from college from their age-mates whose education stops at a lower level.

Concerning the effect of ability on earnings, Becker (1964)--using the same empirical data--concluded that adjusting for differences in ability and family background, reduced the average rate of return on the costs of a college education from approximately 11 percent a year to approximately nine percent a year.

Weisbrod and Karpoff (1968) analyzed the earnings histories of 7000 male graduates of many American colleges and universities who had, in 1956, been employed by the American Telephone and Telegraph Company for three to 50 years. They had no comparable data for high school graduates who had not gone to college, but on the basis of some reasonable assumption derived from their data, they concluded that about one-fourth of the difference between the mean earnings of college graduates and the mean earnings of high school graduates in the United States results from differences in ability and other personal factors.

Hines (1970) found an unadjusted private rate of return on the cost of higher education of 16.2 percent a year. When the income differences were adjusted to take account of differences in ability, the rate of return dropped to 13.2 percent a year, approximately 80 percent of the unadjusted rate of return.

Motivation

Uncontrolled and quite unknown in these relationships among student ability, college quality, and lifetime earnings is the role of motivation. Strength of motivation is probably correlated positively with grades and with quality of the college attended. In some complex way, motivation, perhaps, is influenced by home background. Strength of motivation is probably also correlated with lifetime earnings. If a reliable and reasonably pure measure of strength of motivation had been included in the analysis, one can only speculate as to how much smaller some of the apparent relationships would have been.

Concerning the effect of motivation on individual earnings, Taubman and Wales (1970), using the interaction effect of level of ability and amount of schooling, compared the earnings advantages of college graduates with high school graduates of equal intellectual ability. College graduation or an advanced degree is clearly of greater financial advantage to a student in the top ten percent of the range than to one of lesser ability.

Geographic Difference

Wolfe and Smith (1956) observed the effect of educational attainment, intelligence measured by scores on the IQ test, or rank in class upon the earnings difference on three different regions. In their study, men were classified according to the education each received after finishing high school. The difference in income was greatest for the college graduates in the north and less for those with less education in the south. In a similar analysis using scores on an

intelligence test rather than rank in class, they found that for a man of a given range of intelligence, incomes are higher for those who have more education in the north but less higher in the south. Among men with the same amount of intelligence--like the association with varying amounts of education--suggested an interaction between years of schooling and individual ability measured by scores on the IQ test or rank in class existing only in the middle west regions, but neither in the south or north.

Race

Duncan (1969) helped direct sociologists in the use of income as the dependent variable when he asked, in 1968, whether black-white income differences were due to inheritance of poverty or inheritance of race. He observed that the black-white income gap was $3,790, of which family background differentials accounted for just one-quarter--$940. The educational gap accounted for $520 of the $3,790; the difference actually observed was less than one-seventh. This measures education by number of years rather than in terms of some quality adjusted unit. All of these attributed roughly half to educational difference, family size, and family background. The remaining 11.8 points are not otherwise explained by the model, and he attributed the amount to occupational discrimination. This amounts of $830, or one-fifth of the total dollar gap.

Miller (1971) found that median income by schooling completed differs not only by race but tends to widen between the racial groups with increases in education. In 1968, for example, the difference in median income for whites and blacks, together with other non-whites who had

graduated from elementary school, graduated from high school, or attended college, ranged from $880 to $1,065 to $2,409. Blacks and other non-whites, of course, received less income than did whites who had a comparable education. To be sure, there is a strong and positive relationship between income and schooling for blacks as well as whites. The median income for blacks and other non-whites who attended college one or more years is $3,207 greater than the median for individuals in these populations who stopped their formal education after graduating from secondary school. Nevertheless, these college-educated blacks and other non-white minorities still lagged nearly $2,500 behind whites of a similar education.

Sex

The indluence of ability, background, and formal education or schooling and subsequent success in terms of earnings have been discussed at some length. Sophisticated research on income determinants compare to that done on the white male sample that documents the systematic practice of paying women less. Oppenheimer (1970) reported that the median income of all women in the labor force was only about three-fifths that of men.

Levitin (1971) applied the achievement variable equally to men and women, and found that the average woman receives 71 percent less income than a man with the same scores on achievement variables.

Summary

In the previous research on the relationship between earnings and education, Bridgeman (1930) found that rank in class, campus achievement

and early graduation were significant indices of success in the job market. Hunt found, in 1963, that the relationship among income and ability, experience, and size of college were significant. Becker estimated that the overall rate of return of a college education was approximately 13 percent in 1950. Hanoch, based on the 1960 census data, concluded that the income effect on higher education was sizeable. Hunt reported, in 1964, that graduates of more expensive colleges or universities earned about 50 percent more than did graduates of less expensive institutions. Weisbrod and Karpoff found, in 1968, that graduates of better colleges earned more. Taubman and Wales showed, in 1972, that mathematical ability was important in explaining the range of earnings of college graduates and differences appeared to be very large corresponding to college quality.

The effect of family background on earnings was studied by Wolfe and Smith. They found that the father's occupation had little significant effect on the son's earnings. Taubman and Hagen found that there was a significant relationship between the son's earnings and the father's educational attainment. They said that if the father had progressed as far as the ninth grade, his son earned $300 a year more in 1955 and about $1,200 a year more in 1969 than did those whose father had not entered high school. Reed and Miller found that there was essentially no discernible influence due to the father's education or occupation on the earnings of college graduates in 1972. Hunt found, in 1963, that the effect of the mother's schooling was positive and statistically significant, while that of the father was positive but was not significant.

Concerning the effect of ability on earnings, Becker concluded, in

1964, that differences in ability reduced the average rate of return on the costs of a college education from approximately 11 percent a year to approximately nine percent a year. Weisbrod and Karpoff concluded, in 1968, that about one-fourth of the difference between the mean earnings of high school graduates in the United States results from differences in ability. Hines found, in 1970, that approximately 80 percent of the unadjusted rate of return of college graduates was caused by differences in ability.

As to the effect of motivation on individual earnings, Taubman and Wales concluded, in 1970, that college graduates had the greater financial ability over high school graduates with the same ability.

The effect of geographic differences on earnings was investigated by Wolfe and Smith. They found, in 1956, that the differences in income among college graduates was the greatest in the north and less for those in the south.

The effect of race on earnings difference among college graduates was investigated by Duncan. He found, in 1969, that one-fifth of the total earnings gap between blacks and whites was attributable to racial discrimination. Miller found that college-educated blacks and other non-white minorities still lagged nearly $2,500 a year behind whites of a similar education in 1971.

The research on income differences among opposite sexes was done by Oppenheimer in 1970. She found that the median income of women in the labor force was only about three-fifths that of men. Levitin found that the average woman received 71 percent less income than did a man with the same achievement in 1971.

CHAPTER III

METHODOLOGY

The purpose of this chapter was to describe the procedures used in this study, including the development of the research method. This chapter is organized in the following sequences: Source of Data, Hypotheses to be Tested, Method of Regression Analysis, and Aggregate Linear Regression Model.

Source of Data

The Basic Survey on Wage Structure, published by the Statistics and Information Department, Ministry of Labor, Government of Japan, provided a clear picture of the wage structure of regular employees in major industries, wage distributions by industrial groups, region, size of enterprise, sex, type of regular employees, educational attainment, occupation, employment type, working type, age, duration of service, and years of experience.

1970 Census of Population, published by the United States Department of Commerce, provided data through a regular program of data collection and through supplements to its data collection program conducted for other organizations. The report represents cross-classifications of earnings by characteristics such as occupation, educational attainments, labor force statutes, and age. The statistics in this report are based on a sample inflated to represent the total population. Each single

size indicates the occupational cells which, drawn from 20 percent of the United States working population of each state for American data and also from four percent of the Japanese working population of each prefecture for Japanese data, included four different levels of educational attainments and three different durations of service. The description of the data for the United States and Japan was given in Appendix A.

Hypotheses to be Tested

Regression analysis models allowed an investigation of the relationship between earnings and various demographic characteristics of the sample population, such as educational attainment, years of experience, interaction terms of education and experience, and sector of industry. The components of the model were evaluated by significance level and size of their respective coefficients. The interrelationship between earnings and educational attainment, years of experience, interaction terms of education and experience, and sector of industry were viewed as hypotheses rather than as estimated relationships. The analyses tested hypotheses related to the variables in the model based on three criteria: R^2, significance of the coefficients, and the theoretical acceptability of the signs of the coefficients of the variables.

The Education-Earnings Hypothesis

Additional amounts of formal schooling tend to be associated with additional earnings in the labor market. The magnitude of the earnings differential and the return to investment in formal schooling are highly uncertain. However, certain basic hypotheses were made corresponding to

education and earnings as follows:

Earning ability of the individual increases with the higher level of formal schooling. The test of the education-earnings hypothesis involved the four variables corresponding to four different levels of educational attainment--junior high school, senior high school, junior college, and four years of college. These tests provided an empirical evaluation of the four different independent variables. The test consisted of the determination of the significance of the regression coefficients of the variables retained in the model.

The Experience-Earnings Hypothesis

This hypothesis tested the justification for the inclusion of experience in the regression model. The hypothesis tested was that experience was a significant variable in determination of earnings. The significance of the respective regression coefficients for years of experience variables relevant to the regression form were tested using the t-test and the F-test. The basic definition of the experience-earnings hypothesis is that years of experience are positively correlated to the earnings of individuals in the job market.

The Interaction of Education and Experience-Earnings Hypothesis

This hypothesis tested the interaction effect of education and experience upon earnings. Given values of the independent variables, the significance of the coefficient of the t-value demonstrated potential refinement of the interaction effect on earnings. The test of the

interaction effect hypothesis involved the nine variables corresponding to the interaction of junior high school and ten years of experience, 20 years of experience; senior high school and 10 to 20 years of experience; junior college and 10 to 20 years of experience; four years college and 10 to 20 years of experience, and 30 years of experience. The basic definition of the interaction of education and experience-earnings hypothesis was that the interaction effect is correlated to the individual's earnings in the job market.

The Sector of Industry-Earnings Hypothesis

This hypothesis tested the impact of earnings differences due to the different sectors of industry. The sector of industry was divided into three groups identified as primary, secondary, and tertiary industry. The hypothesis involving the independent variable corresponding to three different sectors of industry was tested. The significance of three independent variables--primary, secondary, and tertiary industry--was tested using the t-test and the F-test. The basic definition of the sector of industry-earning hypothesis was, therefore, that sector of industry correlated to the individual's earnings in the job market.

The Comparative Hypothesis of Earnings Structure of College Graduates in the United States and Japan

This hypothesis tested the differences of earnings structures of college graduates in the United States and Japan. The hypothesis tested was that there was a significant difference existing with the earnings structure of college graduates between the two nations. The significance

of difference between them was tested using the calculated results of the following figures:

1. Percentage change in earnings corresponding to different levels of education in the United States and Japan in Table IV.

2. Percentage change in earnings at each level of education corresponding to different years of experience in the United States and Japan in Table VIII.

3. Earnings advantages of 4-year and 2-year college graduates with different years of experience compared with other groups in the United States and Japan in Tables IX and X.

4. Percentage of change in earnings of college graduates with different years of experience corresponding to different sectors of industry in the United States and Japan in Tables XVI and XVIII.

The basic definition of the comparative hypothesis of earnings structures of college graduates in the United States and Japan was that there was a significant difference existing among earnings structures of college graduates between the United States and Japan.

The Comparative Hypothesis of Change in Earnings Structure of College Graduates Between 1970 and 1977 in Japan

This hypothesis will test the change in earnings structure of college graduates between 1970 and 1977 in Japan. The hypothesis tested was that there was a significant change in earnings structure of Japanese college graduates between 1970 and 1977. The significance of change between 1970 and 1977 was tested using the calculated results of the following figures:

1. Percentage of change in earnings corresponding to each level of education in Japan between 1970 and 1977 in Table XX.

2. Percentage of change in earnings of each level of education corresponding to different years of experience in Japan between 1970 and 1977 in Table XXII.

3. Changes in earnings of 4-year and 2-year college graduates corresponding to different years of experience compared with other groups, such as junior high school and senior high school graduates in Japan between 1970 and 1977 in Table XXIII.

The basic definition of comparative hypotheses of change in earnings structures of college graduates between 1970 and 1977 in Japan was therefore a change in earnings structures of college graduates in Japan between 1970 and 1977.

Method of Regression Analysis

The regression analysis examined essentially the following four objectives:

1. The effect of the level of educational attainments in determining earnings in the United States and Japan.

2. The effect of experience on earnings in the United States and Japan.

3. The effect of interaction of education and experience on the different levels of earnings.

4. The earnings differences among workers in each sector of industry in relation to their level of education and experience.

The way in which the level of education influences earnings has not been well understood. However, education was not separated into

components for the model creation.

Letting Y represent the earnings, Ed represent education, and Z represent other determinants of earnings, the earnings equation may be written as:

$$Y = F(Ed, Z) \qquad (1)$$

A model of aggregate earnings equations with respect to education, experience, and sector of industries was developed. The basic purpose for specifying a set of equations was to estimate different distributions of earnings with respect to determinants such as education and sector of industries. The specific points of interest relating to the profiles were:

1. the relationship of educational attainments to earnings;
2. the relationship of years of experience to earnings;
3. the magnitude of an interaction relationship between education and experience to earnings, and
4. the relationship of different sectors of industry to earnings.

Although the major focus in the earnings equations and on the effect of education, experience, interaction terms, and sector of industries was added to the equation. The experience was measured by the number of years of work after completing education. It was felt necessary at least to add the variable of experience in order to avoid the likely bias caused by computing the relationship experience with the relationship of education, especially in view of the findings that experience exerts an important effect in increasing earnings.

The basic model, then, may be written as:

$$Y = f\ (Ed, Ex, EdEx, Sec) \qquad (2)$$

where

Y = rate of earnings

Ed = education

Ex = experience

EdEx = interaction of educational experience

Sec = sector of industries

Earnings

Earnings was defined as that income derived from personal services rendered as distinct from other kinds of income, a general term embracing revenue or income, money or money equivalents earned or accrued during certain periods or the total moneys or compensation paid for services rendered or time worked, and including wages, overtime, commission, bonuses, etc.

With reference to the wages of an employee, it means the total amount of money received for a week or some other period for services. It is clearly of greater importance than the wage rate, which takes no account of either overtime or short-time. In a period of over-full employment, earnings will for most people be greater than the basic wage, because to this payment must be added the additional pay at a higher rate for overtime. Earnings are the sole dependent variable in the regression model.

Experience

Experience was defined as the current age of a worker minus the age at which he finished the highest level of formal schooling. With regard to the worker, his experience may be general or occupational. Although

the latter is more important for this study, industrial psychologists, placement officers, and others interested in labor problems and personnel work are giving increased attention to an individual's general experience as a factor in judging a worker's abilities, interests, and personality. Therefore, experience may be defined as information, knowledge, and ability obtained through actual work or job performance. "Book learning" may be halpful in understanding or making a job easier to do, but it is not a substitute for actual work performance. An employee's work experience plays an important role in transfers and promotion.

Education

Education was defined as the number of years of formal schooling. Individuals were classified into groups such as "high school" or "college," but this classification did not take into account the variation in the quality of education, which could be great. For example, it is possible for students at some high schools to receive training in calculus, whereas some college graduates never study this branch of mathematics. Simple classification by years of education also fails to take into account the type of education, such as engineering, liberal arts, or teacher training. Classification into education groups based on years is, therefore, a highly imperfect measure of the amount, quality, and intensity of education received. Nonetheless, at this stage of our knowledge, we have no other realistic alternative.

The Japanese data were provided in terms of four categories, namely, junior high school, senior high school, junior college, and college. The American data on formal education were given in terms of

continuous grade corresponding to the particular years of graduation for certain levels of schooling such as elementary school, high school, junior college, and college.

Sector of Industries

Sector of industries were divided into three groups. One was the primary industries which included agriculture, fishery, and forestry. A second group was the secondary industries which included mining, manufacturing, and construction. The third group was the tertiary industries which included wholesale, retail trade, finance, insurance, and real estate, etc.

Aggregate Linear Regression Models

Model 1

Model 1 was the linear regression, which represents a basic earnings function corresponding to the different levels of education:

$$Y = b_1 + b_2 \sum_{i=1}^{3} Ed_i + u_i \qquad (3)$$

where

Y = earnings

Ed = level of education

We used a dummy for this; therefore Ed involves the four different levels of education--junior high school, senior high school, junior college, and college graduates; u was a random disturbance term.

Model 2

Model 2 was a linear regression which represented a basic earnings function corresponding to the different levels of education and experience:

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + e_i \qquad (4)$$

where

Y = earnings

Ed = level of education, using a dummy variable

Ex = years of experience

We used dummy variables for experience. Therefore, Ex corresponded to the three different years of duration of service--10 years, 20 years, and 30 years; e was a random disturbance term.

Model 3

Model 3 was also a linear regression which represented a basic earnings function corresponding to the different levels of education, duration of experience, and the interaction of education and experience.

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{3} Ed_i\, Ex_i + v_i \qquad (5)$$

where

Y = earnings

Ed = level of education, using dummy variables

Ex = years of experience, using dummy variables

EdEx = interaction term of level of education and years of experience, using dummy variables

Therefore, EdEx represented the four different levels of educational attainment--junior high school, senior high school, junior college, and university in relation to the three different years of duration of service--10 years, 20 years, and 30 years. v is a random disturbance term.

Model 4

Model 4 was also a linear regression which represented a basic earnings function corresponding to the different levels of education, duration of experience, the interaction of education and experience, and also the sectors of industry in which people hold jobs.

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{3} Ed_i Ex_i + b_4 \sum_{i=1}^{2} Sec_i + W_i \qquad (6)$$

where

Y = earnings

Ed = level of education, using dummy variable

Ex = years of experience using dummy variable

EdEx = interaction of years of education and years of experience using dummy variable

Sec = sector of industry in which people held jobs, using dummy variable

Therefore, Sec corresponded to the three different sectors of industry--primary, secondary, and tertiary. W was a random disturbance term.

CHAPTER IV

PRESENTATION AND EMPIRICAL ANALYSIS OF DATA AND ASSOCIATED HYPOTHESES TESTING

In this chapter we present the findings of the empirical analysis of the data. It was divided into two sections:

1. The findings about the earnings structure of college graduates compared with other groups, such as junior high school, senior high school, and junior college graduates in the United States and Japan, and an evaluation of the associated hypotheses.

2. The findings about the change in the earnings structure of college graduates compared with other groups, such as junior high school, senior high school, and junior college graduates between 1970 and 1977 in Japan, and an evaluation of the associated hypotheses.

The aggregate earnings equation was used to estimate the education, experience, sector of industry, and earnings profile for the people of both countries. To accomplish this goal, we estimated the coefficient of the earnings equations, using a sample drawn from workers in a number of industries.

The Findings About the Earnings Structure of College Graduates in the United States and Japan and the Evaluation of the Hypotheses

The empirical evaluation of the hypotheses was undertaken in two

phases. The first phase evaluated the significance of coefficient determinants using the t-value of each independent variable. The second phase was undertaken after the coefficient of determinant was accepted. The theoretical analysis was made using the estimated coefficients given by computer utilization. As the evaluation criteria, independent variables in the regression models were evaluated on the basis of statistical significance and coefficient size. As might be seen in Tables VI, VII, VIII, and VIX, some of the coefficients of the interaction terms of experience and education were insignificant. Therefore, further analysis was omitted.

Hypotheses Testing

The Education-Earnings Hypothesis

This hypothesis was tested to evaluate earnings difference of those corresponding to different levels of educational attainment.

The regression results of the aggregate earnings equations with respect to the different levels of education in the United States and Japan in Tables I and II showed that all the coefficients of independent variables were significant. Therefore, we calculated each equation with a separate dummy variable for each of the four possible educational levels. The coefficients of the dummy variable were as follows:

$$Y_{US} = \underset{(25.027)}{11{,}273.83} - \underset{(-5.803)}{3{,}689.67Ed_1} - \underset{(4.356)}{2{,}769.60Ed_2} - \underset{(13.331)}{2{,}136.04Ed_3} \quad R^2 = 0.687 \quad (1)$$

$$Y_{Jap} = \underset{(8.591)}{12{,}238.30} - \underset{(-3.380)}{3{,}611.65Ed_1} - \underset{(-2{,}586)}{2{,}735.23Ed_2} - \underset{(-1.931)}{1{,}132.61Ed_3} \quad R^2 = 0.721 \quad (2)$$

TABLE I

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION IN THE UNITED STATES

Variable	Coefficient	T-Value	Partial-F
Intercept	11,273.83	25.076	628.744
JH	-3,689.67	-5.803	33.675
SH	-2,769.60	-4.356	18.974
JC	-2,136.04	-3.331	11.095

$R^2 = 0.687$; N = 119; D-W = 1.7105

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + U_i$$

Notes: 1) Intercept represents wage or salary of those with college degrees. R^2 = coefficient of determination adjusted for the degree of freedom. N donates sample size. D-W = Dubin-Watson coefficient.

2) JH, SH, and JC represent junior high school, senior high school, junior college graduates.

3) Each sample size indicates the occupational cells which, drawn from 20 percent of the United States working population of each state, included four different levels of educational attainments and three different durations of service.

TABLE II

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION IN JAPAN

Variable	Coefficient	T-Value	Partial-F
Intercept	9,975.94	8.591	73.814
JH	-3,611.65	-3.380	11.423
SH	-2,735.23	-2.586	6.690
JC	-1,132.61	-1.931	3.064
Mean Value of 1969	3,262.26	2.404	5.779
Mean Value of 1977	11,431.93	9.187	84.409

$R^2 = 0.721$; N = 155; D-W = 2.782

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + U_i$$

Notes: 1) Notations other than mean value of 1969, 1977, and sample size are the same as in Table I.

2) Mean value of 1969, 1977 represents mean of people's earnings in 1969, 1977.

3) Each sample size indicates the occupational cells which, drawn from four percent of the Japanese working population of each prefecture, included for different levels of educational attainment and three different durations of service.

where

Y_{US} = wage and salary income in dollars/year

Y_{Jap} = wage and salary income in yen/month

Ed_1 = dummy variable equal to 1 for junior high school education; otherwise 0

Ed_2 = dummy variable equal to 1 for senior high schol education; otherwise 0

Ed_3 = dummy variable equal to 1 for junior college graduation; otherwise 0

The constant term represented wage and salary income of individuals with a college degree

From the above equation, we calculated absolute income differences among four different levels of educational attainment in the United States and Japan in Table III. The analysis went one step further to utilize percentage differences of earnings corresponding to four different levels of educational attainment in both countries in Table IV.

It can be seen from Tables III and IV that wage or income were constantly higher with the higher degree of education for both in the United States and Japan. Absolute income differences in the United States was as follows: If an individual graduated from a 4-year college, the yearly income was $3,689.07 (49 percent) more than one who graduated from junior high school. If an individual graduated from junior college, the yearly income was $1,553.57 (27 percent) more. If an individual graduated from senior high school, the yearly income was $920 (12 percent) more. If an individual graduated from a 4-year college, the yearly income was $2,769.60 (32 percent) more than one who graduated from senior high school. If an individual graduated from junior college, the yearly income was $633.50 (17 percent) more. If an individual graduated from a 4-year college, the yearly income was

TABLE III

ABSOLUTE AMOUNT OF EARNINGS DIFFERENCES CORRESPONDING TO DIFFERENT LEVELS OF EDUCATION IN THE UNITED STATES AND JAPAN

	United States (Yearly Earnings)	Japan (Monthly Earnings)
Junior High School	$7,584.16	Yen - 96,265.50
Senior High School	8,504.23	105,029.70
Junior College	9,137.73	121,055.90
4-yrs College	11,273.83	132,382.00

Note: Calculation was made using Equation (1) for the United States, and Equation (2) for Japan.

TABLE IV

PERCENTAGE CHANGE IN EARNINGS CORRESPONDING TO DIFFERENT LEVELS OF EDUCATION IN THE UNITED STATES AND JAPAN

		JH	SH	JC	4-yr Col.
Junior High School	U. S.	--			
	Japan				
Senior High School	U. S.	(920) 12%	--		
	Japan	(8,764.20) 9%			
Junior College	U. S.	(1,553.57) 27%	(633.50) 17%	--	
	Japan	(24,790.40) 26%	(16,026.20) 15%		
4-yrs College	U. S.	(3,689.07) 49%	(2,769.60) 32%	(2,136.10) 23%	--
	Japan	(36,116.50) 37%	(27,352.30) 26%	(11,326.10) 9%	

Note: Figures in parentheses for the United States indicates change in yearly earnings in terms of U.S. dollars. For Japan, monthly earnings are indicated by the Japanese yen.

$2,136.10 (23 percent) more than one who graduated from junior college.

The absolute income difference in Japan was as follows: if an individual graduated from a 4-year college, the monthly income was 36,116.50 yen (37 percent) more than one who graduated from junior high school. If an individual graduated from junior college, the monthly income was 24,974.40 yen (26 percent) more. If an individual graduated from senior high school, the monthly income was 8,764.20 yen (9 percent) more. If an individual graduated from a 4-year college, the monthly income was 27,352.30 yen (26 percent) more. If an individual graduated from junior college, the monthly income was 16,026.20 yen (15 percent) more. If an individual graduated from a 4-year college, the monthly earnings was 11,326.10 yen (9 percent) more than one who graduated from junior college. The results showed us that the greater gain in earnings or salaries was garnered by the the better education both in the United States and Japan.

The Experience-Earnings Hypothesis

The experience-earnings hypothesis was tested to evaluate earnings differences among people corresponding to different years of experience. From the regression results of aggregate earnings equations with respect to the different levels of education, years of experience in Tables V and VI, we calculated the equation with separate dummy variables for each possible education and experience dummy variable. The coefficient of education and experience dummy variables were as follows:

TABLE V

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE IN THE UNITED STATES

Variable	Coefficient	T-Value	Partial-F
Intercept	11,588.29	22.026	485.160
JH	-3,689.67	-6,067	36.806
SH	-2,755.15	-4.528	20.505
JC	-2,110.25	-3.439	11,832
10 yrs	-1,376.72	-2.629	6.915
20 yrs	433.35	1.916	2.325

$R^2 = 0.526$; N = 119; D-W = 1.625

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{3} Ex_i + e_i$$

Notes: Notation other than intercept and experience dummies are the same as in Table 1.

1) Intercept represents wage or salary of those with college degrees and 30 years of experience.

2) 10 yrs., 20 yrs. represent 10 years and 20 years of experience, respectively.

TABLE VI

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE IN JAPAN

Variable	Coefficient	T-Value	Partial-F
Intercept	14,389.12	18.166	330.000
JH	-3,840.76	-5,838	34.078
SH	-2,766.43	-4.203	17.664
JC	-1,127.49	-1.972	3.849
10 yrs	-8,911.92	-15.532	241.233
20 yrs	-4,161.55	-7.250	52.565
Mean Value of 1969	3,263.20	3.906	15.261
Mean Value of 1977	11,440.41	14.932	222.970

$R^2 = 0.799$; N = 155; D-W = 1.817

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + e_i$$

Notes: Notations are the same as in Tables I and II.

$$Y_{US} = 11{,}588.29 - 3{,}689.67Ed_1 - 2{,}755.15Ed_2 - 2{,}110.25Ed_3 - 1{,}376.72Ex_1$$
$$(22.026) \quad (-6.067) \quad (-4.528) \quad (-3.439) \quad (-2.629)$$
$$-433.35Ex_2 \quad R^2=0.526 \qquad (3)$$
$$(1.916)$$

$$Y_{Jap} = 17{,}652.32 - 3{,}840.76Ed_1 - 2{,}766.43Ed_2 - 1{,}127.49Ed_3$$
$$(18.166) \quad (-5.838) \quad (-4.203) \quad (-1.972)$$
$$8{,}911.92Ex_1 - 4.101.55Ex_2 \quad R^2=0.799 \qquad (4)$$
$$(15.532) \qquad (-7.250)$$

where

Ex_1 = dummy variable equal to 1 if the individual has had 10 years of experience; otherwise 0

Ex_2 = dummy variable equal to 1 if the individual has 11 to 20 years of experience; otherwise 0

The constant term represents the wage or salary income for one who has a college degree and 21 to 30 years of experience

From equations (3) and (4), we calculated absolute income differences among three different durations of service--1 to 10 years, 11 to 20 years, and 21 to 30 years--corresponding to each level of educational attainment in the United States and Japan. Tables VII and VIII showed us absolute amounts of earnings differences and the percentage change in earnings corresponding to each level of education and years of experience in the United States and Japan. It was seen that wages or income were constantly higher with the longer years of experience. Absolute income differences were as follows: In the United States, among junior high school graduates, if an individual had 11 to 20 years of experience, the yearly income was $433.35 (6.6 percent) more than one who had 1 to 10 years of experience. If he had 21 to 30 years of experience,

TABLE VII

ABSOLUTE AMOUNT OF EARNINGS DIFFERENCE AT EACH LEVEL OF EDUCATION CORRESPONDING TO DIFFERENT YEARS OF EXPERIENCE IN THE UNITED STATES AND JAPAN

Years	Junior High		Senior High		Junior College		4 yrs College	
	U.S.	Japan	U.S.	Japan	U.S.	Japan	U.S.	Japan
1-10	6,521.89	59,739.70	7,456.43	69,739.70	8,101.30	76,129.10	10,211.57	87,404.00
11-20	6,955.24	107,243.40	7,889.77	127,253.40	8,534.57	129,632.80	11,588.29	134,907.70
21-30	7,898.62	148,858.90	8,833.14	158,868.90	9,478.04	165,248.30	12,821.29	176,523.20

Notes: 1) Calculation was made using Equation (3) for the United States and Equation (4) for Japan.

2) U.S. figures indicate U.S. dollar term and yearly earning. Japanese figures indicate yen term and monthly earning.

TABLE VIII

PERCENTAGE CHANGE IN EARNINGS AT EACH LEVEL OF EDUCATION CORRESPONDING TO DIFFERENT YEARS OF EXPERIENCE IN THE UNITED STATES AND JAPAN

Years	Junior High		Senior High		Junior College		4 yrs College	
	U.S.	Japan	U.S.	Japan	U.S.	Japan	U.S.	Japan
1-10								
	(433.35)	(47,503.70)	(463.42)	(49,503.42)	(426.35)	(46,503.70)	(1,810.07)	(47,503.70)
11-20	6.6%	70%	5.8%	79.5%	5.3%	62.4%	17.7%	54.3%
	(1,376.73)	(89,119.20)	(1,268.73)	(17,620.10)	(1,406.72)	(88,119.20)	(1,376.72)	(89,119.20)
21-30	21.1%	181%	18.5%	149%	17%	117%	13.5%	102%

Note: Figures in parentheses for the United States indicate changes in absolute amount of earnings in U. S. dollars per year term. Figure for Japan indicate earnings in yen for monthly term.

the yearly income was $1,367.73 (21.1 percent) more than one who had 1 to 10 years of experience. Among senior high school graduates, if an individual had 11 to 20 years of experience, the yearly income was $463.42 (5.8 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the yearly income was $1,268.73 (18.5 percent) more than one who had 1 to 10 years of experience. Among junior college graduates if an individual had 11 to 20 years of experience, the yearly income was $426.35 (5.3 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the yearly income was $1,406.72 (17 percent) more than one who had 1 to 10 years of experience. Among 4-year college graduates, if an individual had 11 to 20 years of experience, the yearly income was $1,810.07 (17.7 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the yearly income was $1,376.72 (13.5 percent) more than one who had 1 to 10 years of experience.

The results indicated that in the United States with respect to each level of educational attainment--junior high school, senior high school, junior college and four years of college, the wages or income were constantly higher with the longer years of experience. If an individual had 11 to 20 years of experience, the wages or income were 6.6, 5.8, 5.3, and 17.9 percent more. If an individual had 21 to 30 years of experience, the wages or income were 21.8, 18.5, 17, and 13.5 percent more, corresponding to four different categories of educational attainments than one who had only 1 to 10 years of experience.

Next, we calculated the earnings difference of each educational attainment with respect to different years of experience in Japan.

Among junior high school graduates, if an individual had 11 to 20 years of experience, the monthly income was 47,503.70 yen (70 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the monthly income was 89,119.20 yen (181 percent) more than one who had 1 to 10 years of experience. Among senior high school graduates, if an individual had 11 to 20 years of experience, the monthly income was 49,503.42 yen (79.5 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the monthly income was 87,620.10 yen (149 percent) more than one who had 1 to 10 years of experience. Among junior college graduates, if an individual had 11 to 20 years of experience, the monthly income was 46,503.70 yen (62.4 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the monthly income was 88,119.20 yen (117 percent) more than one who had 1 to 10 years of experience. Among 4-year college graduates, if an individual had 11 to 20 years of experience, the monthly income was 47,503.70 yen (54.3 percent) more than one who had 1 to 10 years of experience. If an individual had 21 to 30 years of experience, the monthly income was 89,119.20 yen (102 percent) more than one who had 1 to 10 years of experience.

The results indicated that in Japan, with respect to each level of educational attainment--junior high school, senior high school, junior college, and 4-year college--the wages or income were constantly higher with the longer years of experience. If an individual had 11 to 20 years of experience, the wages or income were 70, 79.5, 62.4, and 54.3 percent more. If an individual had 21 to 30 years of experience, the wages or income were 181, 149, 117, and 102 percent more, corresponding

to four different categories of educational attainment than one who had only 1 to 10 years of experience.

Next, we calculated the earnings advantage of 4-year and 2-year college graduates corresponding to each year of experience compared with other groups in the United States and Japan, in Tables IX and X. In the United States, as a result of the comparison between junior college graduates and junior high school graduates, if a 2-year college graduate had 1 to 10 years of experience, the yearly income was $1,579.26 (24 percent) more; if he had 11 to 20 years of experience, the yearly income was $1,528.46 (25 percent) more; if he had 21 to 30 years of experience, the yearly income was $1,519.42 (20 percent) more than junior high school graduates with the same years of experience. As a result of a comparison between junior college graduates and senior high school graduates, if a junior college graduate had 1 to 10 years of experience, the yearly income was $632.90 (9 percent) more; if he had 11 to 20 years of experience, the yearly was $620.80 (9.2 percent) more; if he had 21 to 30 years of experience, the yearly income was $618.90 (7.3 percent) more than senior high school graduates with the same years of experience.

As a result of a comparison between 4-year college graduates and junior high school graduates, if a 4-year college graduate had 1 to 10 years of experience, the yearly income was $3,689.68 (57 percent) more; if he had 11 to 20 years of experience, the yearly income was $5,065.40 (73 percent) more; if he had 21 to 30 years of experience, the yearly income was $3,428.67 (46.7 percent) more than junior high school graduates with the same years of experience. As a result of comparisons between 4-year college graduates and senior high school graduates, if

TABLE IX

EARNINGS ADVANTAGES OF 4-YEAR AND 2-YEAR COLLEGE GRADUATES WITH YEARS OF EXPERIENCE COMPARED WITH OTHER GROUPS IN THE UNITED STATES

	Years	Junior HS 10-20-30 yrs	Senior HS 10-20-30 yrs	2-yr College 10-20-30 yrs	4-yr College 10-20-30 yrs
2-yr College	10	(1,579.26) 24%	(632.90) 9%	--	
	20	(1,528.46) 25%	(620.80) 9.2%		
	30	(1,519.42) 20%	(618.90) 7.3%		
4-yr College	10	(3,689.68) 57%	(2,755.15) 37%	(2,110.25) 26%	--
	20	(5,065.40) 73%	(4,131.87) 52.4%	(3,486.97) 41%	
	30	(3,428.67) 46.7%	(2,681.26) 31.2%	(2,136.42) 22.3%	

Note: Figures in parentheses indicate changes in earnings in U.S. dollar terms corresponding to the same years of experience but different levels of education.

TABLE X

EARNINGS ADVANTAGES OF 4-YEAR AND 2-YEAR COLLEGE GRADUATES WITH YEARS OF EXPERIENCE COMPARED WITH OTHER GROUPS IN JAPAN

	Years	Junior HS 10-20-30 yrs	Senior HS 10-20-30 yrs	2-yr College 10-20-30 yrs	4-yr College 10-20-30 yrs
2-yr College	10	(27,132.50) 55.4%	(16,359.40) 27%	--	
	20	(27,232.30) 28.1%	(16,248.30) 15.1%		
	30	(27,332.60) 19.6%	(16,148.20) 18.6%		
4-yr College	10	(36,507.40) 78%	(27,664.30) 46%	(11,274.90) 14.8%	--
	20	(38,407.40) 39.8%	(27,654.30) 25%	(11,263.30) 9.1%	
	30	(35,606.20) 27.8%	(27,766.40) 18.6%	(11,268.30) 6.8%	

Note: Figures in parentheses indicate changes in earnings in Japanese yen terms corresponding to the same years of experience but different levels of education.

the 4-year college graduate had 1 to 10 years of experience, the yearly income was $2,755.15 (37 percent) more; if he had 11 to 20 years of experience, the yearly income was $4,131.87 (52.4 percent) more; if he had 21 to 30 years of experience, the yearly income was $2,681.26 (31.2 percent) more than senior high school graduates with the same years of experience. As a result of the comparison between 4-year college graduates and junior college graduates, if the 4-year college graduate had 1 to 10 years of experience, the yearly income was $2,110.25 (26 percent) more; if he had 11 to 20 years of experience, the yearly income was $3,486.97 (41 percent) more; if he had 21 to 30 years of experience, the yearly income was $2,136.42 (22.3 percent) more than the junior college graduate with the same years of experience.

The results indicated that in the United States, the earnings advantages of 4-year and 2-year college graduates with respect to years of experience--1 to 10, 11 to 20, and 21 to 30--were ambiguous. If an individual graduated from junior college, the wages or income with respect to each year of experience were 24, 25, and 20 percent more than junior high school graduates; the wages or income were 9, 4.2, and 7.3 percent more than senior high school graduates. If an individual graduated from a 4-year college, the wages or income with respect to each year of experience were 57, 73, and 46.7 percent more than junior high school graduates; the wages or income were 37, 52.4, and 31.2 percent more than senior high school graduates; the wages or income were 26, 41, and 22.3 percent more than the 2-year college graduates.

In Japan, as a result of the comparison between 2-year college graduates and junior high school graduates, if the 2-year college graduate had 1 to 10 years of experience, the monthly income was 27,132.50

yen (55.4 percent) more; if he had 21 to 30 years of experience, the income was 27,332.60 yen (19.6 percent) more than junior high school graduates with the same years of experience. As a result of the comparison between 2-year college graduates and senior high school graduates, if he had 1 to 10 years of experience, the monthly income was 16,359.40 yen (27 percent) more; if he had 11 to 20 years of experience, the monthly income was 16,148.20 yen (18.6 percent) more than senior high school graduates with the same years of experience.

As a result of the comparison between 4-year college graduates and junior high school graduates, if an individual had 1 to 10 years of experience, the monthly income was 36,507.40 yen (78 percent) more; if he had 11 to 20 years of experience, the monthly income was 38,407.40 yen (39.8 percent) more; if he had 21 to 30 years of experience, the monthly income was 35,606.20 yen (27.8 percent) more than junior high school graduates with the same years of experience. As a result of the comparison between 4-year college graduates and senior high school graduates, if the 4-year college graduate had 1 to 10 years of experience, the monthly income was 27,664.30 yen (46 percent) more; if he had 11 to 20 years of experience, the monthly income was 27,654.30 yen (25 percent) more; if he had 11 to 30 years of experience, the monthly income was 27,766.40 yen (18.6 percent) more than senior high school graduates with the same years of experience. As a result of the comparison between 4-year college graduates and 2-year college graduates, if the 4-year college graduate had 1 to 10 years of experience, the monthly income was 11,274.90 yen (14.8 percent) more; if he had 11 to 20 years of experience, the monthly income was 11,263.30 yen (9.1 percent) more; if he had 21 to 30 years of experience, the monthly income was 11,268.30 yen

(5.8 percent) more than the 2-year college graduates with the same years of experience.

The results indicated that in Japan, the earnings advantage of 4-year and 2-year college graduates with respect to years of experience--1 to 10, 11 to 20, and 21 to 30--were constantly decreasing as the individual had more years of experience. If the individual graduated from junior college, wages or income with respect to each year of experience were 55.4, 28.1, and 19.6 percent more than senior high school graduates. If one graduated from a 4-year college, the wages or income were 78, 39.8, and 27.8 percent more than the junior high school graduates; the wages or income were 46, 25, and 18.6 percent more than senior high school graduates, and 14.8, 9.1, and 6.8 percent more than 2-year college graduates.

The Interaction of Education and Experience-Earnings Hypothesis

The interaction of education and experience-earnings hypothesis was constructed to further ascertain the effect of potential education and experience interactions upon earnings. In Tables XI and XII we tested for interactions of each of these five different levels of experience and years of education of both countries using t-value and partial-F in each table. But the interaction effect of the level of education and experience clearly indicated that it was an empirically insignificant coefficient for most interaction terms. The regression coefficient of the interaction terms was also ambiguous. Therefore, further analysis of the effect of the interaction of levels of education and years of experience upon earnings using the coefficient of Tables XI and XII

TABLE XI

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, AND INTERACTION EFFECTS OF LEVELS OF EDUCATION AND YEARS OF EXPERIENCE IN THE UNITED STATES

Variable	Coefficient	T-Value	Partial-F
Intercept	12,029.80	15.973	255.124
JH	-4,328.40	-4.064	16.514
SH	-3,532.53	-3.395	11,523
JC	-2,426.50	-2.278	5.190
10 yrs	-2,764.40	-2.595	6.736
20 yrs	-496.50	1.825	3.272
JH-10 yrs	2,010.30	1.3345	1.781
JH-20 yrs	-94.10	-0.0624	0.004
SH-10 yrs	2,126.43	1.428	2.039
JC-10 yrs	1,380.40	0.916	0.840
JC-20 yrs	-458.37	-0.300	0.090

$R^2 = 0.486$; N = 119; D-W = 1.496

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{3} Ed_i Ex_i + V_i$$

Notes: Notations other than intercept and interaction effect dummies are the same as in Table III.

1) Intercept represents wage or salary of those with college degrees, and also includes the interaction effect of education and years of experience.

2) JH and 10 yrs represent Junior High School degrees and 10 years of experience. JH and 20 yrs represent Junior High School and 20 years of experience. SH and 10 yrs represent Senior High School and 10 years of experience. SH and 20 yrs represents Senior High School and 20 years of experience. JC and 10 years represent Junior College and 10 years of experience. JC and 20 years represent Junior College and 20 years of experience.

TABLE XII

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, AND INTERACTION TERM OF EDUCATION AND EXPERIENCE IN JAPAN

Variable	Coefficient	T-Value	Partial-F
Intercept	14,982.90	15.635	244.466
JH	-6,060.08	-5.471	29.930
SH	-3,002.66	-2.711	7.352
JC	-1,016.06	-1.923	3.842
10 yrs	-10,302.31	-9.139	83.518
20 yrs	-4,636.15	-4.113	10.913
JH-10 yrs	4,315.82	2.699	7.286
JH-20 yrs	2,533.85	1.617	2.616
SH-10 yrs	1,107.32	0.707	0.500
SH-20 yrs	-468.59	-0.293	0.086
HC-10 yrs	50.62	0.031	0.001
JC-20 yrs	-388.85	-0.239	0.057
Mean Value of 1969	3,281.27	3.992	15.939
Mean Value of 1977	11,464.41	15.202	231.105

$R^2 = 0.814$; N = 155; D-W = 1.991

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{2} Ed_i\, Ex_i + V_i$$

Notes: Notations are the same as in Tables II and V.

was omitted.

The Sector of Industry-Earnings Hypothesis

The sector of industry-earnings hypothesis was tested to evaluate the earnings difference among individuals who were working at each different sector of industry. Using the figures in Tables XIII and XIV, we estimated the equation with separate dummy variables for each possible education level, years of experience, and sector of industry. The coefficient of education, experience, and sector of industry were as follows:

$$\begin{aligned} Y_{US} = {} & 12{,}636.55 - 4{,}328.40Ed_1 - 3{,}564.88Ed_2 - 2{,}426.00Ed_3 \\ & (17.953) \quad (-4.528) \quad (-3.815) \quad (2.538) \\ & -2.764.40Ex_1 - 496.50Ex_2 - 2{,}657.48Sec_1 - 250.86Sec_2 \\ & (-2.892) \quad (1.962) \quad (-5.136) \quad (1.962) \qquad (6) \\ & R^2 = 0.478 \end{aligned}$$

where

Sec_1 = dummy variable equal to 1 in the primary sector of industry such as agriculture, pastoral production, fishing, and mining; otherwise 0

Sec_2 = dummy variable equal to 1 in the secondary sector of industry such as manufacturing, construction, etc.; otherwise 0

The constant term represents the wage and salary income of one who has a college degree and 30 years of experience. This also adds the interaction effect of experience and education, and includes the effect of working in the teriary sector of industry.

From equations (5) and (6), we calculated absolute income differences among college graduates with different years of experience corresponding to three different sectors of industries in the United States

TABLE XIII

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, INTERACTION TERMS OF EDUCATION AND EXPERIENCE, AND SECTOR OF INDUSTRY IN THE UNITED STATES

Variable	Coefficient	T-Value	Partial-F
Intercept	12,636.55	17.953	322.297
JH	-4,328.40	-4.528	20,500
SH	-3,504.88	-3.815	14.555
JC	-2,426.60	-2.538	6.443
10 yrs	-2,764.40	-2.892	8.362
20 yrs	-496.50	1.962	2.468
JH-10 yrs	2,010.30	1.487	2.211
JH-20 yrs	-94.10	-0.897	0.568
SH-10 yrs	2,158.78	1,615	2.608
SH-20 yrs	307.46	0.921	1.236
JC-10 yrs	1,380.40	1.021	1.043
JC-20 yrs	-390.95	-0.762	0.921
Primary	-2,657.48	-5.136	26.354
Secondary	-250.86	-1.962	2.468

$R^2 = 0.478$; N = 119; D-W = 1.4905

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{3} Ed_i\, Ex_i + b_4 \sum_{i=1}^{2} Sec_i + W_i$$

Notes: Notation other than intercept and sector of industry dummies are the same as in Table III.

1) Intercept represents wage or salary of those with college degrees 30 years of experience and also includes the interaction effect and holding a job in tertiary industry.

2) Primary indicates primary industry which originally includes agriculture, forestry and pastoral producers in some versions as mining. Secondary indicates secondary industry such as manufacturing generally, including mining and, as a rule, construction.

TABLE XIV

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, INTERACTION TERMS OF EDUCATION AND EXPERIENCE, AND SECTOR OF INDUSTRY IN JAPAN

Variable	Coefficient	T-Value	Partial-F
Intercept	13,749.29	10.343	106.980
JH	-5,991.42	-5.782	33.430
SH	-2,957.74	-2.854	8.147
JC	-1,068.48	-1.992	3.428
10 yrs	-10,302.31	-9.770	15.455
20 yrs	-4,653.62	-4.399	19.349
JH-10 yrs	4,167.05	2.786	7.759
JH-20 yrs	2,410.19	1.642	2.695
SH-10 yrs	1,134.49	0.774	0.599
SH-20 yrs	-410.53	-0.274	0.075
JC-10 yrs	18.92	0.012	0.000
JC-20 yrs	-374.00	-0.245	0.060
Primary	192.94	1.945	3.228
Secondary	2,211.90	2.191	4.800
Mean Value of 1969	3,319.12	4.317	18.638
Mean Value of 1977	11,876.27	15.396	237.040

$R^2 = 0.839$; N = 155; D-W = 1.960

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + b_3 \sum_{i=1}^{2} Ed_i\, Ex_i + b_4 \sum_{i=1}^{2} Soc_i + W_i$$

Notes: Notations are the same as Tables II and VII.

and Japan. Table XV showed that among people with college degrees and 10 years of experience, in the United States if an individual worked in tertiary industry, the yearly income was the highest--approximately $9,872. If he worked in secondary industry, the yearly income was the next highest--approximately $9,621. If he worked in primary industry, the yearly income was the lowest--approximately $7,214.67. Among those with college degrees and 20 years of experience, if an individual worked in tertiary industry, the yearly income was the highest--approximately $12,140. If he worked in secondary industry, the yearly income was the next highest--approximately $11,889. If he worked in primary industry, the yearly income was the lowest--approximately $9,482.57. Among those with college degrees and 30 years of experience, if an individual worked in tertiary industry, the yearly income was the highest--approximately $12,636. If he worked in secondary industry, the yearly income was next to highest--approximately $12,386. If he worked in primary industry, the yearly income was the lowest--approximately $9,979.

Next, we calculated the percentage change in earnings of college graduates with different years of experience corresponding to different sectors of industry in the United States in Table XVI. Among college graduates with 10 years of experience, if an individual worked in secondary industry, the yearly income was $2,406 (33.4 percent) more; if he worked in tertiary industry, the yearly income was $2,657 (36.8 percent) more than one who worked in primary industry. Among college graduates with 20 years of experience, if the individual worked in secondary industry, the yearly income was $2,406 (35.4 percent) more. If he worked in tertiary industry, the yearly income was $2,657 (28 percent) more than one who worked in primary industry. Among college

TABLE XV

ABSOLUTE AMOUNT OF EARNING DIFFERENCES OF COLLEGE GRADUATES WITH DIFFERENT YEARS OF EXPERIENCE CORRESPONDING TO DIFFERENT SECTORS OF INDUSTRY IN THE UNITED STATES

	College Degree + 10 yrs	College Degree + 20 yrs	College Degree + 30 yrs
Primary Industry	7,214.67	9,482.57	9,979.07
Secondary Industry	9,621.29	11,889.19	12,385.69
Tertiary Industry	9,872.15	12,140.25	12,636.55

Note: Calculation was made using Equation (5). Figures indicate yearly earning in United States dollar terms.

TABLE XVI

PERCENTAGE OF CHANGE IN EARNINGS OF COLLEGE GRADUATES WITH DIFFERENT YEARS OF EXPERIENCE, CORRESPONDING TO DIFFERENT SECTORS OF INDUSTRY IN THE UNITED STATES

	College Degree + 10 yrs	College Degree + 20 yrs	College Degree + 30 yrs
Primary Industry	--	--	--
Secondary Industry	(2,406.62) 33.4%	(2,406.63) 25.4%	(2,406.64) 24%
Tertiary Industry	(2,657.48) 36.8%	(2,657.68) 28%	(2,657.50) 26.6%

Notes: 1) Calculation was made using the figure in Table XV.

2) Figures in parentheses indicate absolute amounts of money increase compared to earnings in the Primary Industry.

graduates with 30 years of experience. If he worked in secondary industry, the yearly income was $2,406 (24 percent) more. If he worked in tertiary industry, the yearly income was $2,657 (26.6 percent) more than one who worked in primary industry.

The results indicated that in the United States among college graduates with each different years of experience, individuals who worked in the tertiary sector of industry had the highest earnings; those who worked in the secondary sector of industry had the next highest earnings, and those who worked in the primary sector of industry had the lowest earnings.

The earnings difference of college graduates with different years of experience corresponding to different sectors of industry in Japan was shown in Table XVII. Among college graduates with 10 years of experience--if an individual worked in secondary industry, the monthly income was the highest--approximately 182,118 yen. If he worked in tertiary industry, the monthly income was the lowest--approximately 159,999 yen. Among college graduates with 20 years of experience, if an individual worked in secondary industry, the monthly income was the highest--approximately 188,153 yen. If he worked in primary industry, the monthly income was next to highest--approximately 167,963 yen. If he worked in tertiary industry, the monthly income was lowest--approximately 166,034 yen. Among college graduates with 30 years of experience, if an individual worked in secondary industry, the monthly income was highest--approximately 192,803.10 yen. If he worked in primary industry, the monthly income was next highest--approximately 172,613.50 yen. If he worked in tertiary industry, the monthly income was lowest--approximately 170,684.10 yen.

TABLE XVII

EARNING DIFFERENCE OF COLLEGE GRADUATES WITH DIFFERENT YEARS OF EXPERIENCE CORRESPONDING TO DIFFERENT SECTORS OF INDUSTRY IN JAPAN

	College Degree + 10 yrs	College Degree + 20 yrs	College Degree + 30 yrs
Primary Industry	161,928.70	167,963.40	172,613.50
Secondary Industry	182,118,30	188,153.00	192,803.10
Tertiary Industry	159,999.30	166,034.00	170,084.10

Note: Calculation was made using Equation (6). Figure indicates monthly earnings in Japanese yen.

Next, we calculated the percentage change in earnings of college graduates with different years of experience corresponding to different sectors of industry in Japan in Table XVIII. Among college graduates with 10 years of experience, if an individual worked in primary industry, the monthly income was 1,929.40 yen (1.2 percent) more. If he worked in secondary industry, the monthly income was 2,221.90 yen (13.8 percent) more than one who worked in tertiary industry. Among college graduates with 20 years of experience, if an individual worked in primary industry, the monthly income was 1,939.40 yen (1.2 percent) more. If he worked in secondary industry, the monthly income was 2,221.90 yen (13.3 percent) more than one who worked in tertiary industry. Among college graduates with 30 years of experience, if an individual worked in primary industry, the monthly income was 1,928.40 yen (1.1 percent) more. If he worked in secondary industry, the monthly income was 2,214.90 yen (13 percent) more than one who worked in tertiary industry.

The results indicated that, in Japan, among college graduates with each years of experience, those who worked in the secondary sector of industry had the highest earnings; those who worked in the primary sector of industry had next highest earnings, but approximately one percent better off than those who worked in the tertiary sector of industry, which had the lowest earnings.

The Comparative Hypothesis of Earnings Structure of College Graduates in the United States and Japan

This hypothesis was tested to evaluate differences in earnings structures of college graduates in the United States and Japan.

TABLE XVIII

PERCENTAGE CHANGE IN EARNINGS OF COLLEGE GRADUATES WITH DIFFERENT YEARS OF EXPERIENCE CORRESPONDING TO DIFFERENT SECTORS OF INDUSTRY IN JAPAN

	College Degree + 10 yrs	College Degree + 20 yrs	College Degree + 30 yrs
Tertiary Industry	--	--	--
Primary Industry	(1,929.40)	(1,939.40)	(1,928.40)
	1.2%	1.2%	1.1%
Secondary Industry	(2,211.90)	(2,271.90)	(2,214.90)
	13.8%	13.3%	13%

Notes: 1) Calculation was made using figures in Table 17.

2) Figures in parentheses indicate absolute amount of money increase compared to earnings in tertiary industry.

The percentage change in earnings corresponding to different levels of education in the United States and Japan was shown in Table IV. Using the figure in Table IV, we compared the value of college degrees in terms of income or earnings between the United States and Japan. The percentage change in earnings corresponding to each level of educational attainment was as follows: If an invividual graduated from a 4-year college, the income was 49 percent more in the United States but only 37 percent more in Japan than one who graduated from junior high school; the income was 32 percent more in the United States but only 26 percent more in Japan than one who graduated from senior high school; the income was 23 percent more in the United States but only 9 percent more in Japan than junior college graduates.

The results indicated that the value of college degrees in terms of income or earning compared with other groups, such as junior high school, senior high school, and junior college, was higher in the United States than in Japan.

The percentage change in earnings at each level of education corresponding to different years of experience in the United States and Japan was shown in Table VIII. Using the figure in Table VIII, we compared the earnings difference of each educational attainment with respect to different years of experience between the United States and Japan. Among junior high school graduates, if an individual had 11 to 20 years of experience, the income was only 6.6 percent more in the United States, but 70 percent more in Japan. If he had 21 to 30 years of experience, the income was only 21.1 percent more in the United States but 181 percent more in Japan than one who had 1 to 10 years of experience. Among senior high school graduates, if an individual had

11 to 20 years of experience, the income was only 5.8 percent more in the United States, but 79.5 percent more in Japan. If he had 21 to 30 years of experience, the income was only 18.5 percent more in the United States but 149 percent more in Japan than one who had 1 to 10 uears of experience. Among junior college graduates, if an individual had 11 to 20 years of experience, the income was only 15.3 percent more in the United States, but 62.4 percent more in Japan. If he had 21 to 30 years of experience, the yearly income was only 17 percent more in the United States but 117 percent more in Japan than one who had 1 to 10 years of experience. Among 4-year college graduates, if an individual had 11 to 21 years of experience, the income was only 17.7 percent more in the United States, but 54.3 percent more in Japan. If he had 21 to 30 years of experience, the income was only 13.5 percent more in the United States, but 102 percent more in Japan than one who had 1 to 10 years of experience.

The results indicated that the percentage change in earnings of each level of educational attainment corresponding to different years of experience was greater in Japan than in the United States. This could be interpreted as meaning that:

1. The traditional seniority system has a strong effect on wages and salaries in Japan, and

2. Experience is a more important factor to determine wages and salaries in Japan than in the United States.

Earnings advantages of graduates of 4-year and 2-year colleges with different years of experience compared with other groups in the United States and Japan was shown in Tables IX and X. Using the figures in Tables IX and X, we compared the earnings advantage of graduates

of 4-year and 2-year colleges corresponding to each year of experience compared with other groups between the United States and Japan. Among 2-year college graduates, if the individual had 1 to 10 years of experience, the income was only 24 percent in the United States, but 55.4 percent more in Japan. If he had 11 to 20 years of experience, the income was only 25 percent more in the United States, but 28.1 percent more in Japan. If he had 21 to 30 years of experience, the income was only 20 percent more in the United States, but 19.6 percent more in Japan than junior high school graduates with the same years of experience. As a result of comparison between 2-year college graduates and senior high school graduates between the United States and Japan, if 2-year college graduates had 1 to 10 years of experience, the income was only 9 percent more in the United States, but 27 percent more in Japan. If he had 21 to 30 years of experience, the income was only 7.3 percent more in the United States but 18.6 percent more in Japan than senior high school graduates with the same years of experience. Among 4-year college graduates, if 4-year college graduates had 1 to 10 years of experience, the income was only 57 percent more in the United States, but 78 percent more in Japan. If he had 11 to 20 years of experience, the income was 73 percent more in the United States, but only 39.8 percent more in Japan. If he had 21 to 30 years of experience, the income was 40 percent more in the United States, but only 27.8 percent more in Japan than junior high school graduates with the same years of experience. Ad a result of comparison among 4-year college graduates and senior high school graduates in the United States and Japan, if 4-year college graduates had 1 to 10 years of experience, the income was only 37 percent more in the United States, but 46 percent more in Japan. If

he had 11 to 20 years of experience, the income was 52.4 percent more in the United States, but only 25 percent more in Japan. If he had 21 to 30 years of experience, the income was 31.2 percent more in the United States, but only 18.6 percent more in Japan than senior high school graduates with the same years of experience.

As a result of comparison between 4-year college graduates and junior college graduates, if 4-year college graduates had 1 to 10 years of experience, the income was 26 percent more in the United States, but only 14.8 percent more in Japan. If he had 11 to 20 years of experience, the income was 41 percent more in the United States, but only 9.1 percent more in Japan. If he had 21 to 30 years of experience, the income was 22.3 percent more in the United States, but 6.8 percent more in Japan, than one who graduated from a 2-year college with the same years of experience.

As the characteristics of the percentage earnings advantage of 4-year and 2-year college graduates compared with other groups with respect to different years of experience was ambiguous in the United States. Those with 11 to 20 years of experience had the largest percentage earnings advantage; those with 1 to 10 years of experience had the next largest, and those with 21 to 30 years of experience had the smallest. On the contrary, in Japan, those with 1 to 10 years of experience had the largest percentage earning advantage, but which declined continually later on. This could be interpreted to mean that external experience was a very important factor to decide wages and salaries in Japan rather than in the United States.

The percentage change in earnings of college graduates with different years of experience corresponding to different sectors of industry

in the United States and Japan was shown in Tables XVI and XVIII. Using the figures in Tables XVI and XVII, we compared the percentage change in earnings of college graduates with respect to different years of experience corresponding to different sectors of industry between the United States and Japan. Among those who had 1 to 10 years of experience, if an individual worked in secondary industry, the income was 33.4 percent more. If he worked in tertiary industry, the income was 36.8 percent more than one who worked in primary industry in the United States. But in Japan, if he worked in the primary sector of industry, the income was 1.2 percent more. If he worked in the secondary sector of industry, the income was 13.8 percent more than one who worked in tertiary industry. Among those with 11 to 20 years of experience, if an individual worked in the secondary sector of industry, the income was 25.4 percent more. If he worked in tertiary industry, the income was 28 percent more than one who worked in primary industry in the United States. But in Japan, if he worked in the primary sector of industry, the income was 1.2 percent more. If an individual worked in the secondary sector of industry, the income was 13.3 percent more than one who worked in tertiary industry. Among those with 21 to 30 years of experience, if an individual worked in secondary industry, the income was 24 percent more. If he worked in tertiary industry, the income was 26.6 percent more than one who worked in primary industry in the United States. But in Japan, if an individual worked in the primary sector of industry, the income was 1.1 percent more. If he worked in the secondary sector of industry, the income was 13 percent more than one who worked in the tertiary sector of industry.

As the findings of the percentage earning advantage of college

graduates in different sectors of industry, one who worked in the tertiary sector of industry, such as transportation, communications, trade, government, personal and domestic services, had the highest income, and one who worked in the secondary sector of industry, such as manufacturing, construction, etc., had the next highest income, and one who worked in the primary sector, such as agriculture, fishing, and mining, had the lowest income in the United States. On the contrary, in Japan, one who had a job in the secondary sector of industry had the highest income. One who had a job in the primary sector of industry was the next highest, and one who had a job in the tertiary sector of industry had the lowest income.

This could be interpreted to mean that in the United States, tertiary, secondary, and primary sectors of industry, in this order, were the most specialized sectors of industry where the most competitive individuals were working. On the contrary, in Japan, the secondary, primary, and tertiary sectors of industry, in this order, were the most specialized sectors of industry where the most competitive individuals were working if the job market satisfied the following conditions:

1. The labor market perfection existed and the figures reflected the occupational mobility of workers.

2. The labor market achieved an equilibrium of equalized return to their wages and salaries.

3. The figures reflected the inclusion in return to equal returns to "innate" qualities or return to the education of some qualities.

The Findings About the Change in Earnings Structure of College Graduates in Japan Between 1970 and 1977, and the Evaluation of the Hypothesis

Traditionally, college education had been a major route for social and economic advance in Japan, providing individuals with training that promised high earnings and provided the nation with scientific and technical specialists and skilled white-collar workers. Viewed as an economic investment in skills, college training had been highly profitable to individuals and to society, and had been an integral part of the dream of success and the good life.

But college job markets deteriorated greatly in the 1970s. To pin down the cause of the depressed market of the 1970s and predicted period of over-education, in this section we examined the change in earnings structure of college graduates compared to other groups, such as junior high school, senior high school, and junior college graduates between 1970 and 1977 in Japan.

The Comparative Hypothesis of Change in Earnings Structure of College Graduates in Japan Between 1970 and 1977

The hypothesis was tested to evaluate the change in earnings structure of college graduates in Japan between 1970 and 1977.

The absolute income differences among each different level of educational attainment in Japan in 1970 to 1977 was shown in Table XIX. The percentage change in earnings advantage corresponding to each level of education in Japan in 1970 and 1977 was also shown in Table XX. The percentage change in earnings advantage among senior high school, 2-year

TABLE XIX

ABSOLUTE AMOUNT OF EARNINGS DIFFERENCES CORRESPONDING TO THE LEVEL OF EDUCATION IN JAPAN IN 1970 AND 1977

	1970	1977
Junior High School	96,265.50	177,962.20
Senior High School	105,029.70	186,726,40
Junior College	121,055.90	202,752.60
4-yr College	132,382.00	214,078.70

Note: Figures in 1970 and 1977 indicate earnings in yen with nominal value of yen in each year.

TABLE XX

PERCENTAGE OF CHANGE IN EARNINGS CORRESPONDING TO EACH LEVEL OF EDUCATION IN JAPAN IN 1970 AND 1977

	Year	JH	SH	JC	4-yr Col.
Junior High School	1970	--			
	1977				
Senior High School	1970	(8,764.20) 9%	--		
	1977	(8,764.50) 4.9%	--		
Junior College	1970	(24,790.40) 26%	(16,026.20) 15%		
	1977	(23,642.80) 13.9%	(15,942.30) 8.6%	--	
4-yr College	1970	(36,116.50) 37%	(27,352.30) 26%	(11,326.10) 9%	--
	1977	(35,261.50) 20.3%	(26,352.40) 16.7%	(11,325.40) 5.6%	--

Note: Figures in parentheses indicate changes in earnings with nominal value of yen in 1970 and 1977.

college and 4-year college graduates compared with junior high school graduates between 1970 and 1977 were as follows: If the individual graduated from senior high school, the monthly income was 9 percent more in 1970 but only 4.9 percent more in 1977. If he graduated from junior college, the monthly income was 26 percent more but only 13.9 more in 1977. If he graduated from a 4-year college, the monthly income was 37 percent more but only 20.3 percent more in 1977 than one who graduated from junior high school. If the individual was graduated from junior college, the monthly income was 15 percent more in 1970 but only 8.6 percent more in 1977. If he graduated from a 4-year college, the monthly income was 26 percent more in 1970 but only 16.7 percent more in 1977 than one who graduated from senior high school. If the individual graduated from a 4-year college, the monthly income was 9 percent more in 1970 but only 5.6 percent more in 1977 than one who graduated from junior college. Therefore, the results clearly showed us the earnings difference corresponding to each level of educational attainment was greatly changed between 1970 and 1977. In most cases, earnings advantage of each level of educational attainment decreased approximately 36.8 percent.

Next, we calculated the earnings differenct of different levels of education corresponding to different years of experience in Japan between 1970 and 1977 in Table XXI, and the percentage change in earnings of different levels of education corresponding to different years of experience in Japan between 1970 and 1977 in Table XXII. The percentage change in earnings advantage of each level of education corresponding to different years of experience between 1970 and 1977 was as follows: Among junior high school graduates, if an individual had 11

TABLE XXI

ABSOLUTE AMOUNT OF EARNINGS DIFFERENCE OF EACH LEVEL OF EDUCATION CORRESPONDING TO DIFFERENT YEARS OF EXPERIENCE IN JAPAN IN 1970 AND 1977

Years	Junior High School		Senior High School	
	1970	1977	1970	1977
1-10	59,739.70	130,768.70	89,739.70	141,511.80
11-20	107,243.40	178,282.40	127,253.40	189,015.50
21-30	148,858.90	219,887.90	168,868.90	230,631.00
	Junior College		4-yr College	
1-10	96,129.10	157,901.20	87,404.00	169,176.10
11-20	129,632.80	205,404.90	134,407.70	216,679.80
21-30	165,248.30	247,020.40	176,523.20	258,295.30

Notes: 1) Calculation was made using Equation (4).

2) Figures indicate earnings with nominal value of yen in 1970 and 1977.

TABLE XXII

PERCENTAGE OF CHANGE IN EARNINGS OF EACH LEVEL OF EDUCATION CORRESPONDING TO DIFFERENT YEARS OF EXPERIENCE IN JAPAN IN 1970 AND 1977

Years	Junior High School		Senior High School	
	1970	1977	1970	1977
1-10	--	--	--	--
11-20	(47,503.70)	(47,513.70)	(49,503.42)	(47,524.70)
	70%	36.3%	79.5%	33.6%
21-30	(89,119.20)	(89,169.20)	(87,620.10)	(89,219.00)
	181%	68%	149%	63%
	Junior College		4-yr College	
1-10	--	--	--	--
11-20	(46,503.70)	(46,703.80)	(47,503.70)	(46,513.80)
	62.4%	30.1%	54.3%	28.1%
21-30	(88,119.20)	(89,218.40)	(89,119.20)	(87,116.20)
	117%	56.4%	102%	52.7%

Note: Figures in parentheses indicate change in absolute amount of earnings with nominal value of the yen in 1970 and 1977.

to 20 years of experience, the monthly income was 70 percent more in 1970, but only 36.3 percent more in 1977. If he had 21 to 30 years of experience, the monthly income was 181 percent more in 1970 but only 68 percent more in 1977 than one who had 1 to 10 years of experience. Among senior high school graduates, if an individual had 11 to 20 years of experience, the monthly income was 79.5 percent more in 1970 but only 33.6 percent more in 1977. If he had 21 to 30 years of experience, the monthly income was 149 percent more in 1970 but only 63 percent more in 1977 than one who had 1 to 10 years of experience. Among junior college graduates, if an individual had 11 to 20 years of experience, the monthly income was 62.4 percent more in 1970 but only 30.1 percent more in 1977. If he had 21 to 30 years of experience, the monthly earnings was 117 percent more in 1970 but only 65.4 percent more than one who had 1 to 10 years of experience. Among 4-year college graduates, if an individual had 11 to 20 years of experience, the montly incom was 54.3 percent more in 1970 but only 28.1 percent more in 1977. If he had 21 to 30 years of experience, the monthly income was 102 percent more in 1970 but only 52.7 percent more in 1977 than one who had 1 to 10 years of experience. The results indicated that the earnings difference of each level of educational attainment with each different duration of experience--1 to 10, 11 to 20, and 21 to 30 years--decreased approximately 42.6 percent between 1970 and 1977.

Next, we calculated the change in earnings percent advantage of 2-year and 4-year college graduates corresponding to different years of experience compared with other groups such as junior high school and senior high school graduates in Japan between 1970 and 1977 in Table XXIII. Among 2-year college graduates, if an individual had 10 years

TABLE XXIII

CHANGES IN EARNINGS OF 4-YEAR AND 2-YEAR COLLEGE GRADUATES CORRESPONDING TO DIFFERENT YEARS OF EXPERIENCE COMPARED WITH OTHER GROUPS IN JAPAN IN 1970 AND 1977

	Yrs		Junior HS 10-20-30 yrs	Senior HS 10-20-30 yrs	2-yr College 10-20-30 yrs	4-yr College 10-20-30 yrs
2-yr College	10	'70	(27,132.50) 55.4%	(16,359.40) 27%		
		'77	(26,321.50) 20.7%	(16,389.40) 11.6%		
	20	'70	(27,232.50) 28.1%	(16,248.30) 15.1%	--	--
		'77	(27,112.50) 15.2%	(16,389.40) 8.7%		
	30	'70	(27,332.60) 19.6%	(16,148.20) 18.6%		
		'77	(27,132.50) 12.3%	(16,426.30) 7.1%		
4-yr College	10	'70	(36,507.40) 78%	(27,664.30) 46%	(11,274.90) 14.8%	
		'77	(38,407.40) 29.4%	(27,564.30) 19.6%	(11,247.80) 7.1%	
	20	'70	(38,407.40) 39.8%	(27,654.30) 25%	(11,263.30) 9.1%	
		'77	(38,397.40) 15.2%	(27,664.30) 14.6%	(11,274.90) 5.4%	--
	30	'70	(35,606.20) 27.8%	(27,766.40) 18.6%	(11,268.30) 6.8%	
		'77	(38,341.60) 17.4%	(11,274.90) 4.9%	(11,864.90) 4.6%	

Note: Notation is the same as Table IX.

of experience, the monthly income was 55.4 percent more in 1970 but only 20.7 percent more in 1977. If he had 20 years of experience, the monthly income was 28.1 percent more in 1970 but only 15.2 percent more in 1977. If he had 30 years of experience, the monthly income was 19.6 percent more in 1970 but only 12.3 percent more in 1977 than one who graduated from junior high school with the same years of experience.

As a result of comparison between junior college graduates and senior high school graduates, if the junior college graduate had 10 years of experience, the monthly income was 27 percent more in 1970 but only 11.6 percent more in 1977. If he had 20 years of experience, the monthly income was 15.1 percent more in 1970 but only 8.7 percent more in 1977. If he had 30 years of experience, the monthly income was 18.6 percent more in 1970 but only 7.1 percent more in 1977 than one who had graduated from senior high school with the same years of experience.

Among 4-year college graduates, if an individual had 10 years of experience, the monthly income was 70 percent more in 1970 but only 29.4 percent more in 1977. If he had 20 years of experience, the monthly income was 39.8 percent more in 1970 but only 15.2 percent more in 1977. If he had 30 years of experience, the monthly income was 27.8 percent more in 1970 but only 17.4 percent more in 1977 than one who graduated from junior high school with the same years of experience. As a result of comparison between 4-year college graduates and senior high school graduates, if the 4-year college graduate had 10 years of experience, the monthly income was 46 percent more in 1970 but only 19.6 percent more in 1977. If he had 20 years of experience, the monthly income was 25 percent more in 1970 but only 14.6 percent more in 1977. If he had 30 years of experience, the monthly income was 18.6 percent more in 1970

but only 4.9 percent more in 1977 than one who graduated from senior high school with the same years of experience. As a result of comparison between 4-year college graduates and 2-year college graduates, if the 4-year college graduate had 10 years of experience, the monthly income was 14.8 percent more in 1970 but only 7.1 percent more in 1977. If he had 20 years of experience, the monthly income was 9.1 percent more in 1970 but only 5.4 percent more in 1977. If he had 30 years of experience, the monthly income was 6.8 percent more in 1970 but only 4.6 percent more in 1977 than one who graduated from Junior college with the same years of experience.

The results indicated that the earning advantage of 4-year and 2-year college graduates compared with other groups, such as junior high school, senior high school, and junior college graduates in each year of experience decreased approximately 37.4 percent between 1970 and 1977 in Japan.

CHAPTER V

FINDINGS AND RECOMMENDATIONS

Concerns over unemployment and under-employment of college and university graduates is growing. Regardless of whether the current problem is a cyclical or permanent phenomenon, it has raised serious questions about the role of systems of higher education in virtually every country where it has appeared. The severity of being unable to find jobs for college graduates adequately matched with their training varies from student field to field, institution to institution, and the actual extent of unemployment or under-employment among graduates is difficult to establish. Nonetheless, events in the United States and Japan indicate that the problem is a source of concern for college faculties, administrators, and also for students.

The purpose of this research was to measure the effect of educational attainment, experience, and workers' sector of industries on the individual's earnings in the United States and Japan. A focus on the economic value of higher education and especially changes in economic value over time provided a better understanding of significant dimensions of the problems of unemployment and underemployment and the effects of these problems on higher education. The findings of the study were summarized as follows:

Findings

1. The greatest gain in income was obtained by the better educated both in the United States and Japan. In the United States, the annual income of the graduate of a 4-year college was $3,689.07 (49 percent) more than the individual who completed junior high school only. The annual income of a junior college graduate was $1,553.57 (27 percent) more. The annual income of a senior high school graduate was $920 (12 percent) more. In Japan, the graduate of a 4-year college earned a monthly income of 36,117 yen (37 percent) more than the graduate of a junior high school. The junior college graduate earned a monthly income of 24,794 yen (26 percent) more. The senior high school graduate earned an income of 8,762 yen (9 percent) more.

2. The value of college degrees in the terms of income or earnings compared with other groups such as junior high school, senior high school, and junior college graduates, was higher in the United States than in Japan. If the individual graduated from a 4-year college, the income was 49 percent more in the United States, but only 37 percent more in Japan than one who graduated from junior high school. The income was 32 percent more in the United States, but only 26 percent more in Japan than one who graduated from senior high school. The income was 23 percent more in the United States but only 9 percent more in Japan than junior college graduates.

3. The income or earnings increased constantly with the longer years of experience for both those in the United States and Japan. Among 4-year college graduates in the United States, if the individual had 11 to 20 years of experience, the annual income was $1,810.07 (17.7 percent) more than the individual with 1 to 10 years of experience.

The individual with 21 to 30 years of experience earned an annual income of $1,376.72 (13.5 percent) more. On the other hand, among 4-year college graduates in Japan, if the individual had 11 to 20 years of experience, the monthly income was 47,503.70 yen (54.3 percent) more than the individual who had 1 to 10 years of experience. The individual with 21 to 30 years of experience earned a monthly income of 89,119.20 yen (102 percent) more.

4. The percentage change in earnings of 4-year and 2-year college graduates corresponding to different years of experience was greater in Japan than in the United States.

5. The earnings advantage of 4-year and 2-year college graduates was compared with other groups with respect to years of experience--1 to 10, 11 to 20, and 21 to 30 years. In the United States, if the individual graduated from junior college, the income was 24 percent, 25 percent, and 20 percent more than junior high school graduates. The income was 9 percent, 9.2 percent, and 7.3 percent more than senior high school graduates. If the individual graduated from a 4-year college, the income was 57 percent, 73 percent, and 46.7 percent more than junior high school graduates. The income was 37 percent, 52.4 percent, and 31.2 percent more than senior high school graduates. The income was 26 percent, 41 percent, and 22.3 percent more than junior college graduates. On the contrary in Japan, the results indicated with years of experience--1 to 10, 11 to 20, and 21 to 30 years--if one graduated from two years of college, the income was 55.4 percent, 28.1 percent, and 19.6 percent more than junior high school graduates. The income was 57 percent, 73 percent, and 18.6 percent more than senior high school graduates. If the individual graduated from a 4-year college,

the income was 78 percent, 39.8 percent, and 27.8 percent more than junior high school graduates. The income was 46 percent, 25 percent, and 18.6 percent more than senior high school graduates. The income was 14.8 percent, 9.1 percent, and 6.8 percen more than 2-year college graduates in Japan.

6. The earnings advantage of 4-year and 2-year college graduates compared with other groups such as junior high school and senior high school graduates decreased more with longer years of experience in Japan than in the United States.

7. The percentage earnings advantage of 4-year and 2-year college graduates with different years of experience corresponding to different sectors of industry in the United States and Japan revealed that, in the United States, one who worked in the tertiary sector of industry, such as transportation, communication, trade, government, personal and domestic services, had the highest earnings and one who worked in the secondary industry, such as manufacturing and construction, had the next highest; one who worked in the primary sector of industry, such as agriculture, fishing, and mining, had the lowest earnings. On the contrary in Japan, one who worked in the secondary sector of industry had the highest income. One who worked in the primary sector of industry had the lowest income.

8. The earnings difference of each level of educational attainment decreased an average of 36.8 percent between 1970 and 1977 in Japan.

9. The earnings difference of each level of educational attainment with different years of experience--1 to 10, 11 to 20, and 21 to 30 years--decreased an average of 42.6 percent between 1970 and 1977

in Japan.

10. The earnings advantage of 4-year and 2-year college graduates compared with other groups in each year of experience decreased an average of 37.5 percent between 1970 and 1977 in Japan.

Recommendations for Future Study

There is a general consideration of the problems of estimating the rate of return to education, reviewing in detail both conceptual issues and the problems which arise because of the kinds of data which are available. The results of this study indicated that the rates of return which were calculated should be interpreted with care. There are difficulties in their estimation which have not yet been overcome because of the limitations and restrictive assumptions remaining in the estimation of the return (reward) of eduation. Thus, the results cannot be accepted as indicting the "true" rates of return relative to educated labor.

For example, the differences in calculated rates of return of education may be a result of differences in hours of work that are also associated with education. The standardized incomes for hours of work does, in fact, make a difference in the calculated rates of return. Most research assumes that an individual's income-leisure preference does not itself change with wage rates, even though it is usually claimed that education, which affects wage rates, does affect a variety of individual preferences. Most research also assumes that individuals are not constrained by the social patterns of their occupations or their labor contracts to work specific numbers of hours per day. In fact, there is a variety of legal and union contract restrictions as

as well as common practices that are not easily modified to individual choice. These constraints as well as inherent difficulties of finding a representative hours-earnings for all occupations, make it impossible to achieve a completely satisfactory adjustment of reported incomes in order to isolate the effects of education in changing earning power. Therefore, individual incomes should be standardized for hours worked in order to eliminate the effects of income-leisure substitution and also legal union contract restrictions.

The available estimates of age-income profiles and returns to education have assumed that simple adjustments will convert cross-section data into a picture of future life-history data. No simple adjustments, however, will resolve the profound difficulties that exist. Both demand and supply influences that affect the relation of income to education need to be investigated. Any observed life history of incomes for individuals with certain levels of education will reflect supply and demand forces which act differently at different ages. Likewise, any observed cross-section of incomes for individuals with a specified level of education will similarly reflect many supply and demand forces acting differently at different ages. Therefore, it is important to consider the effects of supply and demand situations in the job market to estimate the rates of return to the different levels of education.

The disaggregated approach to pursue the goal of learning more about the source of variation in returns to education by making a number of such calculations on an occupational basis has a number of potential advantages. It permits the comparison of individuals who are more nearly similar in their personal characteristics than is

possible if all college graduates are compared with all high school graduates, as has been done in this research. It also helps to identify sources of differences in rates of return which are associated with the characteristics of popular occupations; e.g., the characteristics of length of hours worked, the degree of control over the labor market, etc. Differential "returns to education" in various occupations, if they are found, must therefore: 1) be due to labor market imperfections or reflect the costs of occupational mobility; 2) indicate that the market labor has not achieved an equilibrium of equalized returns; 3) reflect the inclusion in returns of differential rents to "innate" qualities or returns to education of different qualities. And, if any of these conditions exist, the rate of return calculated for all labor in an educational category cannot be interpreted as revealing the return to investment in education. Each of these three conditions deserves close attention. Thus, disaggregation on an occupational basis helps: 1) to define groups of individuals with relatively homogeneous personal characteristics of intelligence, physical aptitude and personality to relate the effect of earnings; 2) to achieve homogeneity in the "socio'economic" background of the labor forces that are being compared. "Socio-economic factors" may be related to income both through the quality and quantity of the education obtained by the individual and also independently of the level of education. Above all, it is desirable to continue the disaggregation to the level of the industry and region as well as occupation to calculate the rate of return to education more accurately.

Further Recommendations

Higher education has been perceived as the sure route to a good job and high income, but a different situation has appeared in recent years. Graduates have experienced difficulty in finding jobs adequately matched with their training. Therefore, there is a need to resolve these problems and improve the job market for college graduates. The following recommendations are made regarding the problems of unemployment and under-employment of college graduates in the United States and Japan.

1. Government agencies should give high priority to the development of more adequate programs of data-gathering and analysis related to manpower programs of college graduates.

2. Government agencies and other appropriate bodies should undertake studies of the implications of the changing job market for holders of degrees and for enrollment in degree programs.

3. Government agencies should take steps to improve the flow of current occupational information and make it more readily available to students.

4. Individual institutions should consider adjusting their programs to changing job markets for graduates--not only in the short run, but also in the long run.

5. Each institution should take steps to strengthen occupational counseling programs available to its students.

SELECTED BIBLIOGRAPHY

"Job Market for College Graduates." Chronicles of Higher Education," September 27, 1976, p. 7.

Freeman, Richard B. The Overeducated American. New York: Academic Press, 1976.

Schultz, Theodore W. The Economic Value of Education. New York: Columbia University Press, 1963.

Becker, Gary. Human Capital: Theoretical and Empirical Analysis With Special Reference to Education. New York: National Bureau of Economic Research and Columbia University Press, 1964.

Mincer, Jacob. "The Distribution of Labour Increase: A Survey With Special Reference to the Human Capital Approach." Journal of Economic Literature, 1970, pp. 1-26.

Bridgman, Donald N. "Success in College and Business." The Personal Journal, Summer, 1930, pp. 1-19.

Hunt, Shane J. "Income Determinants for College Graduates and the Return to Educational Investment." Yale Economic Essays, Fall, 1963, pp. 304-357.

Hanoch, Giova. "Personal Earnings and Investment in Schooling." Unpublished Ph.D. Dissertation, The University of Chicago, 1965.

Weisbrod, Burton, and Karpoff, Pall. "Monetary Returns to College Education, Student Ability, and College Quality." The Review of Economic and Statistics, Fall, 1968, pp. 491-497.

Daniere, Andrew, and Mechling, Joseph. "Direct Marginal Productivity of College Education in Relation to College Aptitude of Students and Production Costs of Institutions." The Journal of Human Resources, Fall, 1970, pp. 51-170.

Tabman, Paul J., and Wales, Terence. Earnings: Higher Education, Mental Ability, and Screening. New York: National Bureau of Economic Research Press, 1972.

Wolfe, Dael, and Smith, Joseph G. "The Occupational Value of Education for Superior Highschool Graduates." Journal of Higher Education, Summer, 1956, pp. 201-232.

Tabman, Paul J., and Wales, Terence. Education as an Investment and as a Screening Device. New York: National Bureau of Economic Research, 1970.

Blau, Peter M., and Duncan, Otis D. The American Occupational Structure. New York: Wiley & Sons, 1967.

Reed, Richard H., and Miller, Henry P. "Some Determinants of the Variation in Earnings for College Men." The Journal of Human Resources, Fall, 1970, pp. 177-190.

Hine, Fred, Tweeten, Luther, and Redfern, Martin. "Social and Private Rates of Return to Investment." In "Schooling by Race-Sex Groups and Regions." The Journal of Human Resources, Spring, 1970, pp. 310-340.

Duncan, Otis D. Inheritance of Poverty OR Inheritance of Race? Perspectives From the Social Science. New York: Basic Books, 1969.

Miller, Harman P. Rich Man, Poor Man. New York: T. Y. Crowell, 1971.

Oppenheimer, Viki K. The Female Labour Force in the United States. Berkeley: University of California Press, 1970.

Levitin, Tompson. "Sex Discrimination Against the American Working Woman." American Behavior Scientist, Fall, 1971, pp. 235-254.

Guitiches, Zivi, and Mason, William M. "Education, Income, and Ability." The Journal of Political Economy, June, 1972, pp. 74-107.

Hause, John. "Earning Profile: Ability and Schooling." The Journal of Political Economy, June, 1972, pp. 108-141.

Japan Ministry of Labour. The Labour Statistics and Research Division. Basic Survey on Wage Structure, April 1969-1977. Tokyo: Japan Ministry of Labour.

Johnston, J. J. Econometric Methods. New York: McGraw-Hill, 1973.

U. S. Dept. of Commerce, Social and Economic Statistics Administration, Bureau of the Census. U. S. Census of Population, 1970. Earnings by Occupation and Education. Washington, D. C.: U. S. Government Printing Office, 1973.

Hodgkinson, Harold. Identity Crisis in Higher Education. San Francisco: Jossey Bass, Inc., 1971.

McMahon, Walter W. Investment in Higher Education. London: Lexington Books, 1974.

Gordon, Margaret M. Higher Education and the Labour Market. The Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1974.

Adkin, Douglas L. The Great American Degree Machine: An Economic Analysis of the Human Resource Output of Higher Education. The Carnegie Commission on Higher Education. New York: McGraw Hill Book Company, 1975.

Schultz, Theodore W. Investment in Education: The Equity-Efficiency Quandary. Chicago: The University of Chicago Press, 1972.

Solmon, Lewis C. College as a Training Ground for Jobs. New York: Praegen Publishers, 1977.

Tuster, Thomas F. Education, Income and Human Behavior. The Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1975.

Becker, Gary S. Human Capital: A Theoretical and Empirical Analysis With Special Reference to Education. New York: National Bureau of Economic Research, 1975.

Berg, Ivar. Education and Jobs: The Great Training Robbery. New York: Praegen Publishers, 1970.

Mincer, Jacob. Schooling, Experience and Earnings. New York: Columbia University Press, 1974.

Blaug, Mark. Economics of Education: A Selected Annotated Bibliography. Oxford: Pergamon Press, 1970.

Withey, Stephen B. A Degree and What Else? Correlates and Consequences of a College Education. New York: Academic Press, 1976.

Freeman, Richard B. The Market for College Trained Manpower. A Study in the Economics of Career. Cambridge, Massachusetts: Harvard University Press, 1971.

Morgan, James M., and Martin, David M. "Education and Income." Quarterly Journal of Economics, August, 1963, pp. 423-437.

Japan Prime Minister's Offic, Bureau of Statistics. Statistical Handbook of Japan. Tokyo: Prime Minister's Office, 1977.

Eckans, Richard S. Estimating the Returns to Education. A Disaggrogated Approach. The Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1973.

Psacharopoulous, George. Returns to Education. Amsterdam: Elsenier Scientific Publishing Company, 1973.

Radner, Roy. Demand and Supply in U. S. Higher Education. The Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1975.

Silkin, Alan L. Education, Unemployment and Economic Growth. Boston: Lexington Books, 1974.

Feldman, Kenneth A. "Studying the Impact of Colleges on Students." Sociology of Education, Vol. 42, No. 3, Summer, 1969, pp. 207-237.

Kmenta, Jan. Elements of Econometrics. London: The Macmillan Company, 1971.

U. S. Department of Health, Education and Welfare, National Center for Education Statistics. The Condition of Education. Washington, D. C.: U. S. Government Printing Office, 1970-1977.

Ministry of Labour, Bureau of Employment Security. Report on Employment Service. Tokyo: Ministry of Labour, 1970-1977.

Ministry of Education. School Basic Survey. Tokyo: Ministry of Education, 1970-1977.

APPENDIX A

DESCRIPTION OF THE DATA FOR THE UNITED STATES AND JAPAN

Description of the Data for the United States and Japan

The United States data were collected from the 1970 Census, which presents detailed statistics for the United States and regions on the earnings of males 18 years old and over, classified by various demographic, social, and economic characteristics. The report presents cross-classifications of earnings by characteristics such as occupation, educational attainments, labor force status, and age. The statistics in this report are based on a sample inflated to represent the total population. Statistics on earnings, based on a 20-percent sample, are presented for the United States. The data on earnings were derived from questionnaires mailed to individuals.

Information on money earnings received in the calendar year 1969 was requested from all persons 14 years old and over in the 20 percent sample. "Total earnings" is the algebraic sum of the amounts of wage or salary income. The figure represents the amount of income received before deductions for personal income taxes, social security, bond purchases, union dues, and medical deductions, etc. Wage or salary income is defined as the total money earnings received for work performed as an employee at any time during the calendar year 1969. It includes wages, salaries, pay from armed forces, commissions, tips, piece-rate pauments, and net bonuses earned. Nonfarm net self-employment income is defined as net money income, gross receipts minus business expense, received from a business, professional enterprise or partnership in which the person was engaged on his own account. Gross receipts include the value of all goods sold and service rendered. Business expenses include cost of goods purchased, rent, heat, light, power, depreciation

charges, wages, and salaries paid, business taxes, but not personal income taxes Farm net self-employment income, gross receipts minus operating expenses received from the operation of a farm by a person on his own account as an owner, renter, or share cropper. Gross receipts include the value of all products sold, governmental subsidies, money received from the rental of farm equipment ot others, and incidental receipts from the sale of wood, sand and gravel, etc. Operating expenses include the cost of fuel, fertilizer, seed, and other farming supplies, cash wages paid to farm hands, depreciation changes, cash rent, interest on farm mortgages, farm building repairs, farm taxes. The value of food and other farm products used for family living is not included as part of net income.

The occupational classification system developed for the 1970 Census consists of all specific occupational categories arranged into 12 major occupational groups.

The limitations of the United States data are as follows: the questionnaire entries for earnings are frequently based on memory and not on records; many persons tend to forget minor or irregular sources of income and, therefore, under-report their earnings. In addition, there are errors of reporting due to misunderstanding of the earnings questions. One such error is the reporting of gross instead of net dollar amount for the two questions on net self-employment income, which results in the over-statement of these items. Another common error is the reporting of identical dollar amounts in two of the three earnings items where a respondent with only one source of earnings assumed that the second amount should be entered to represent total earnings. Such instances of over-reporting would have an impact on

the level of mean earnings for the various occupation groups published in this report.

Description of the Data for Japan

The Japanese data were collected from the Basic Survey on Wage Structure, which aims at obtaining a clear picture of the wage structure of regular employees in major industries; i.e., wage distributions by individual groups, regions, sizes of enterprise, sex, type of regular employees, educational attainment, occupation, employment type, working type, age, duration of service, and years of experience. This report also investigates the situation of accessions and separations in the establishments of major industries.

As to accessions, the data defined the following items: 1) characteristics, such as sex, educational attainment, native place, and occupational history, etc.; 2) employment status, job, wage change, channel of accession and residence, etc., at the time of accession; 3) previous industry, size, and occupation, etc.

As to separations, data defined the following items: 1) characteristics such as sex, age, and educational attainment, etc.; 2) employment status, occupation, length of service, and reason for separation, etc.

This survey also covers establishments employing usually 30 or more regular employees in private and public sectors, in mining, construction, manufacturing, wholesale and retail trades, finance and insurance, real estate, transport and communication, electricity, gas, water, and steam service. This survey is conducted at the end of every month. "Total earnings" can be defined as cash earnings which are defined as money earned before income tax, social insurance contribution, union

dues, payment for purchased commodities, etc. Contractual cash earnings which are defined as earnings paid on the basis of method and conditions previously determined by labor contracts, collective agreements or wage regulations of establishments. Special cash payments which are defined as amount actually paid to the employee during survey period for extra-ordinary or emergent cases without any previous agreement, contract or rule. Retroactive payment of wages for past months as a result of a new agreement is also included. Through their terms and amounts are fixed by collective agreements, payments such as summer and year-end bonuses which are paid for such periods longer than three months, and allowances such as marriage allowances which are paid for unforeseen events are included.

The definitions of regular employees are: 1) employed indefinitely or under a contract for a period longer than one month; 2) employed for 18 or more days in previous two calendar months, of those employed on a daily basis or under a contract for a period less than one month; 3) such officials as directors who attend regularly and receive monthly payments; 4) family members of a self-employed who work with him regularly and receive monthly payments.

The limitations of Japanese data are as follows: the designed accuracy is fixed for the average contractual cash payment per regular employee, and as for each enterprise size with 100 or more employees within 0.6 percent for each enterprise size in the lowest unit industry in the material total, and as for enterprise with less than 100 employees, 0.8 for national total and data are colleged from four percent of each prefecture.

APPENDIX B

CONDITION OF HIGHER EDUCATION IN THE UNITED STATES

TABLE XXIV

ESTIMATES AND PROJECTIONS OF THE UNITED STATES POPULATION IN 1974

Age	Total	Male	Female	Age	Total	Male	Female
All Ages	211,909	103,454	108,455	45-49	11,853	5,746	6,107
0- 4	16,305	8,329	7,976	50-54	11,967	5,759	6,208
5- 9	17,593	8,964	8,629	55-59	10,302	4,912	5,390
10-14	20,719	10,564	10,155	60-64	9,205	4,299	4,906
15-19	20,824	10,570	10,254	65-69	7,835	3,473	4,362
20-24	18,733	9,416	9,317	70-74	5,702	2,411	3,291
25-29	16,223	8,074	8,149	75-79	3,929	1,551	2,378
30-34	13,547	6,696	6,851	80-84	2,606	954	1,652
35-39	11,444	5,593	5,851	85 Over	1,743	577	1,166
40-44	11,377	5,563	5,814				

Source: U. S. Department of Commerce, Bureau of Census, Projections of the Population of the United States, 1975 to 2050, Series p-20, No. 601, p. 36, 1975.

TABLE XXV

STUDENT ENROLLMENT, NUMBER OF GRADUATES, AND NUMBER OF JUNIOR COLLEGES IN THE UNITED STATES (1960-1975)

Year	Student Enrollment	Increased Ratio (%)	Number of Graduates	Increased Ratio (%)	Number of Schools
1960	617,000		72,368		557
1962	774,000	125	96,821	134	628
1964	989,000	128	111,607	115	642
1966	1,326,000	134	139,183	125	685
1968	1,752,000	135	159,441	115	726
1970	2,323,000	124	206,023	199	897
1973	2,922,000	131	252,610	123	1,080
1974	3,312,000	113	292,119	116	1,151
1975	3,871,000	117	321,108	110	1,128

Source: U. S. Department of Health, Education and Welfare, National Center for Education Statistics. The Condition of Education, p. 106, 1976.

TABLE XXVI

STUDENT ENROLLMENT, NUMBER OF GRADUATES, AND NUMBER OF COLLEGES AND UNIVERSITIES IN THE UNITED STATES (1960-1975)

Year	Student Enrollment	Increased Ratio (%)	Number of Graduates	Increased Ratio (%)	Number of Schools
1960	3,171,000		392,432		1,400
1962	3,381,000	107	386,492	98	1,472
1964	3,630,000	107	505,265	131	1,536
1966	4,291,000	118	562,962	111	1,567
1968	5,721,000	133	734,070	130	1,808
1970	6,358,000	111	846,110	115	1,676
1978	6,682,000	105	930,272	110	1,776
1974	6,912,000	103	945,237	102	1,887
1975	7,138,000	107	931,663	99	1,898

Source: U. S. Department of Health, Education and Welfare, National Center for Education Statistics. The Condition of Education, p. 187, 1976.

TABLE XXVII

NUMBER OF GRADUATE SCHOOL GRADUATES IN THE UNITED STATES (1965-1975)

Year	Masters		Doctors	
	Graduates	Increased Ratio (%)	Graduates	Increased Ratio (%)
1965	117,152		18,239	
1966	140,548	120	20,621	113
1967	157,707	112	23,091	112
1969	193,756	110	19,872	129
1970	208,291	108	32,113	108
1973	263,340	126	34,792	108
1974	277,030	105	33,826	97
1975	293,651	106	34,086	101

Source: U. S. Department of Health, Education and Welfare, National Center for Education Statistics. The Condition of Education, p. 189, 1976.

APPENDIX C

THE UNEMPLOYMENT RATIO OF GRADUATES OF HIGHER EDUCATION IN THE UNITED STATES

TABLE XXVIII

UNEMPLOYMENT RATE BY AGE AND YEARS OF SCHOOL COMPLETED IN THE UNITED STATES (1971-1977)

Fiscal Year	School Years	Percentage of Labor Force Unemployed		
		Total, 18 years old & over	18 & 19 years	20 to 24 years
1971	Junior College	5.6	13.7	9.8
	College	2.3	-	5.4
1973	Junior College	4.3	8.8	6.6
	College	2.7	-	5.5
1975	Junior College	6.9	8.7	11.1
	College	2.9	-	6.5
1976	Junior College	6.3	12.9	9.3
	College	2.4	-	5.4
1977	Junior College	6.0	9.0	9.1
	College	3.3	-	8.2

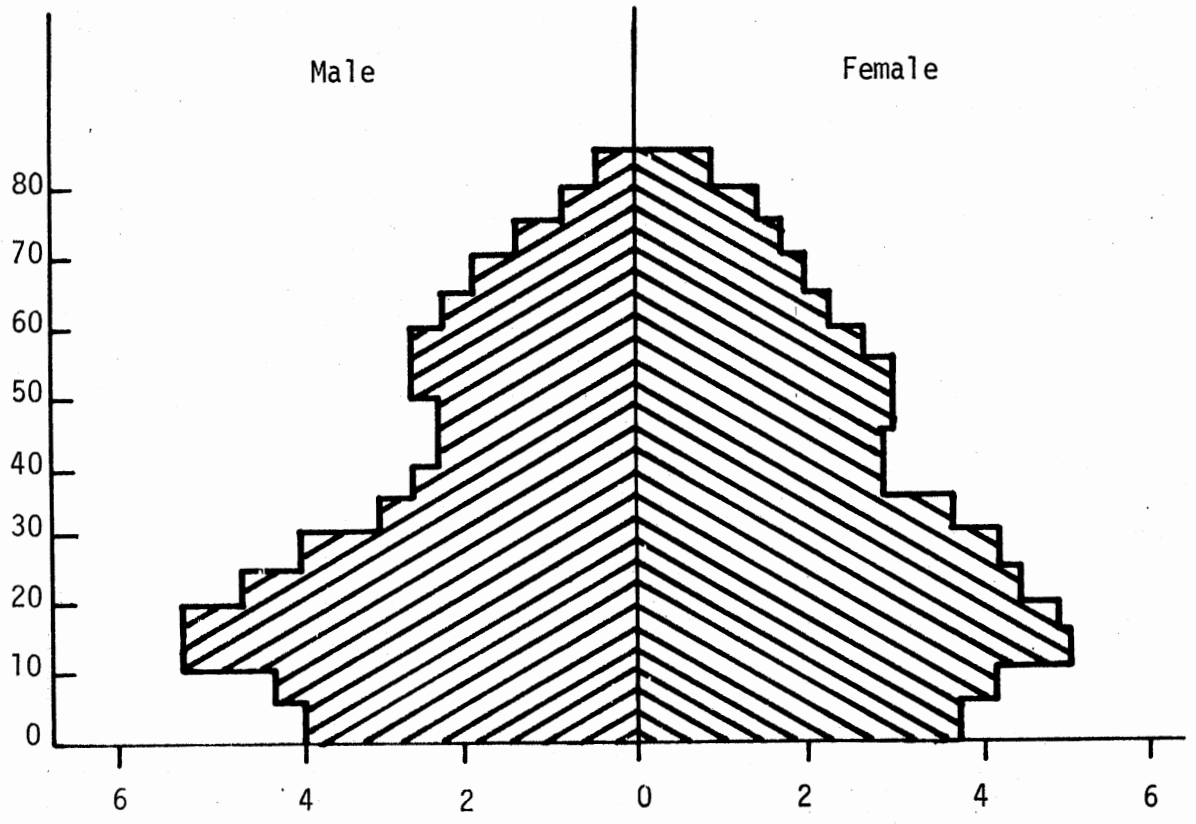
Source: U. S. Department of Labor, Bureau of Labor Statistics. Special Labor Force Report, pp. 140, 151, 133, 204. Educational Attainment of Workers, 1971, 1973, 1975, 1976, 1977.

TABLE XXIX

EMPLOYMENT STATUS OF THE POPULATION BY SCHOOL COMPLETED - U. S. JUNIOR COLLEGE, COLLEGE AND UNIVERSITY, AND GRADUATE SCHOOL (thousands)

Fiscal Year	Type of Institution	Total Number	Working	Occupation	Unemployed (%)
	Junior College	11,138	10,509	629	6
1971	4-year College	6,563	6,363	200	3
	Graduate School	4,296	4,245	51	1
	Junior College	121,422	11,919	503	4
1973	4-year College	7,463	7,279	184	2
	Graduate School	4,905	4,833	72	2
	Junior College	14,066	13,096	972	7
1975	4-year College	8,550	8,240	310	4
	Graduate School	5,778	6,672	106	2
	Junior College	14,889	13,944	945	6
1976	4-year College	9,214	8,909	305	3
	Graduate College	6,141	6,068	124	2
	Junior College	15,649	14,705	944	6
1977	4-year College	9,597	9,215	382	4
	Graduate College	6,603	6,448	154	2

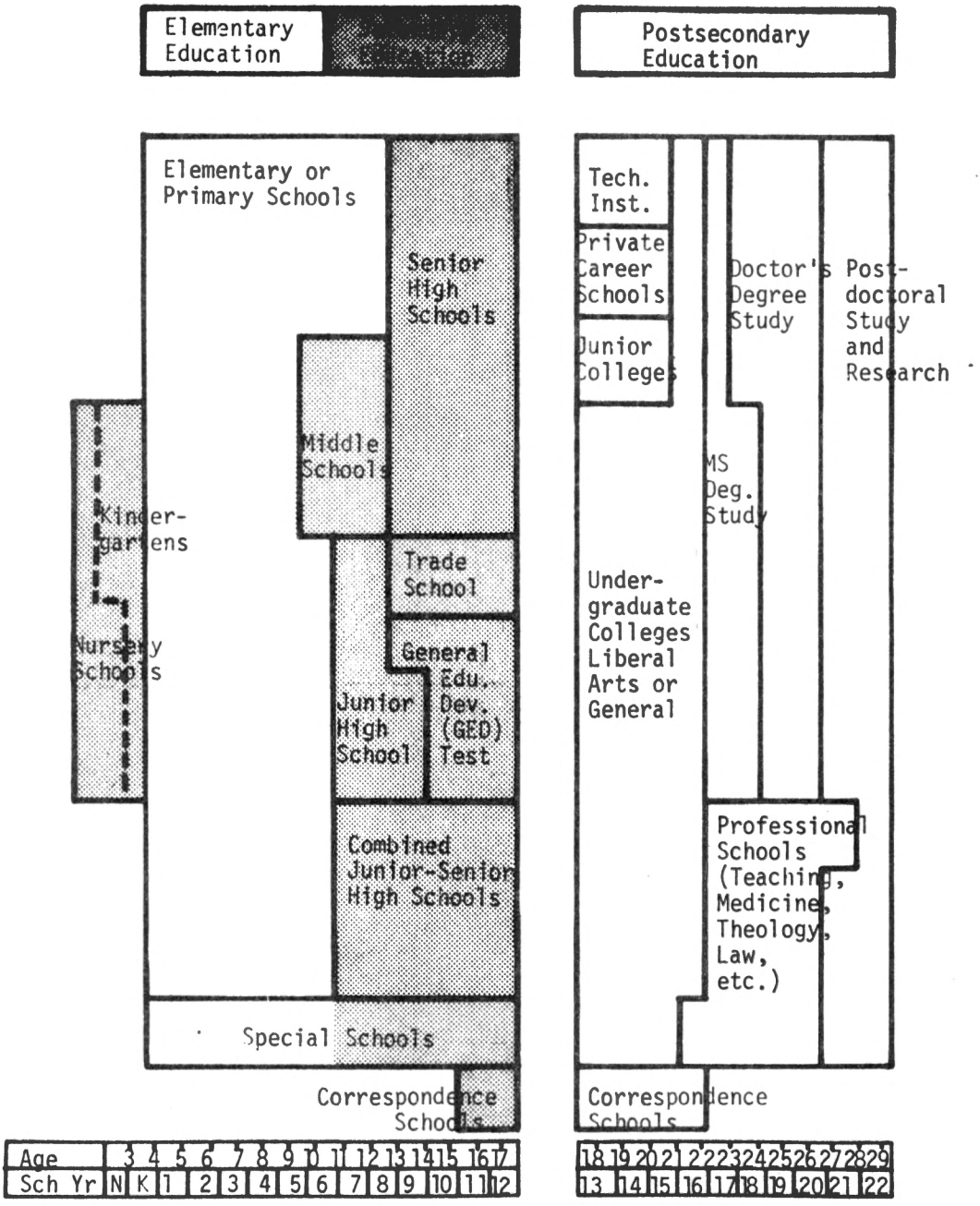
Source: U. S. Department of Labor, Bureau of Labor Statistics. Special Labor Force Report, pp. 140, 161, 193, 204. Educational Attainment of Workers, 1971, 1973, 1975, 1976, 1977.



Source: U. S. Department of Commerce, Bureau of the Census, Projections of the Population of the United States, 1975 to 2050 Series, p. 20, No. 601, p. 36 (1975).

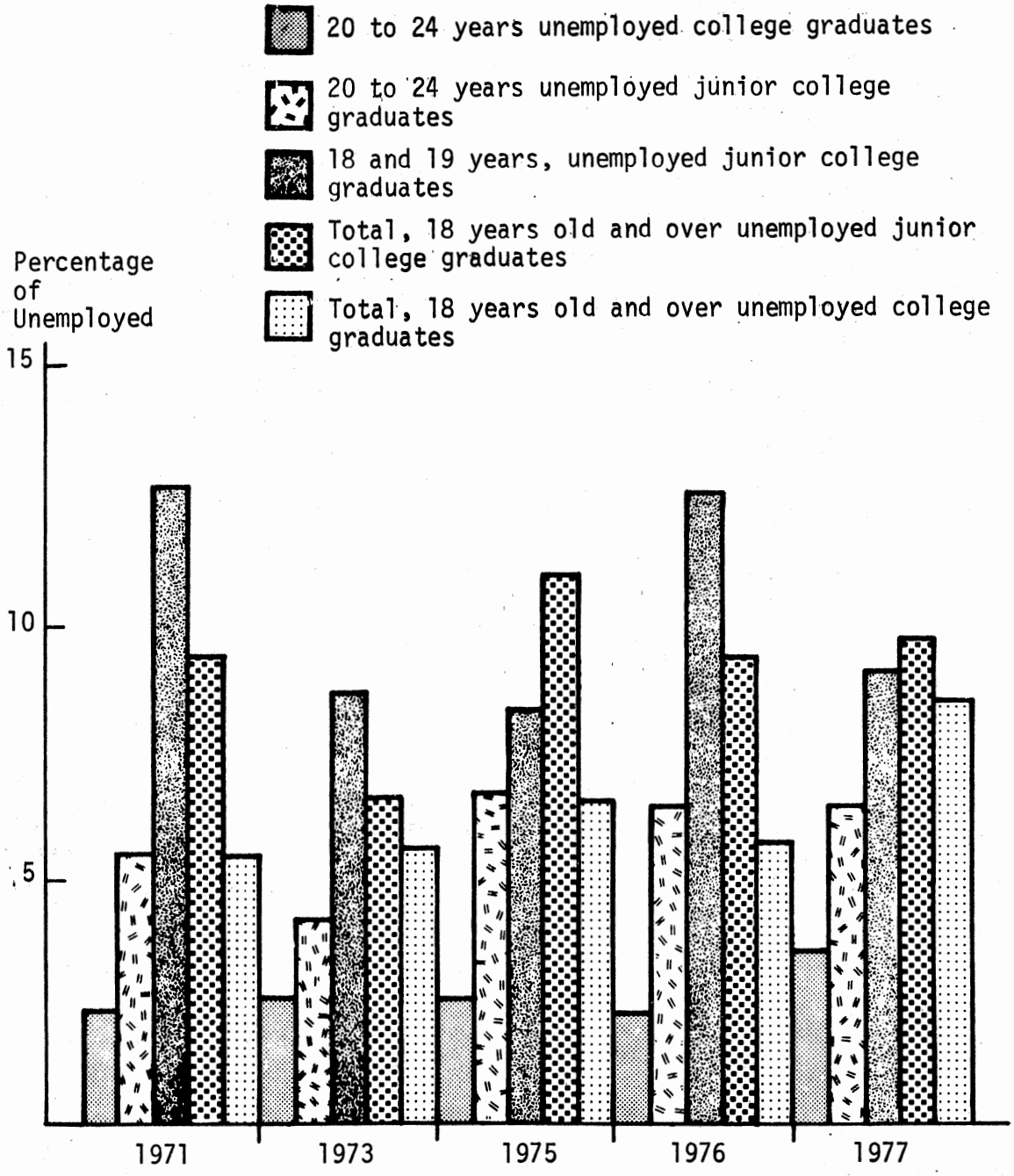
Figure 1. Population Pyramid of the United States (1974)

A range of school organizational patterns and subdivisions exists within the basic elementary/seconary and post-secondary levels.



Source: United States Department of Health, Education and Welfare, National Center for Education Statistics, p. 14 (1976).

Figure 2. The Structure of Education in the United States



Source: United States Department of Labor, Bureau of Labor Statistics, Special Labor Force Report, pp. 140, 101, 133, 204. Educational Attainment of Worker, 1971, 1973, 1975, 1976, 1977.

Figure 3. Ratio of Unemployment by Years of School Completed and Age in the United States

APPENDIX D

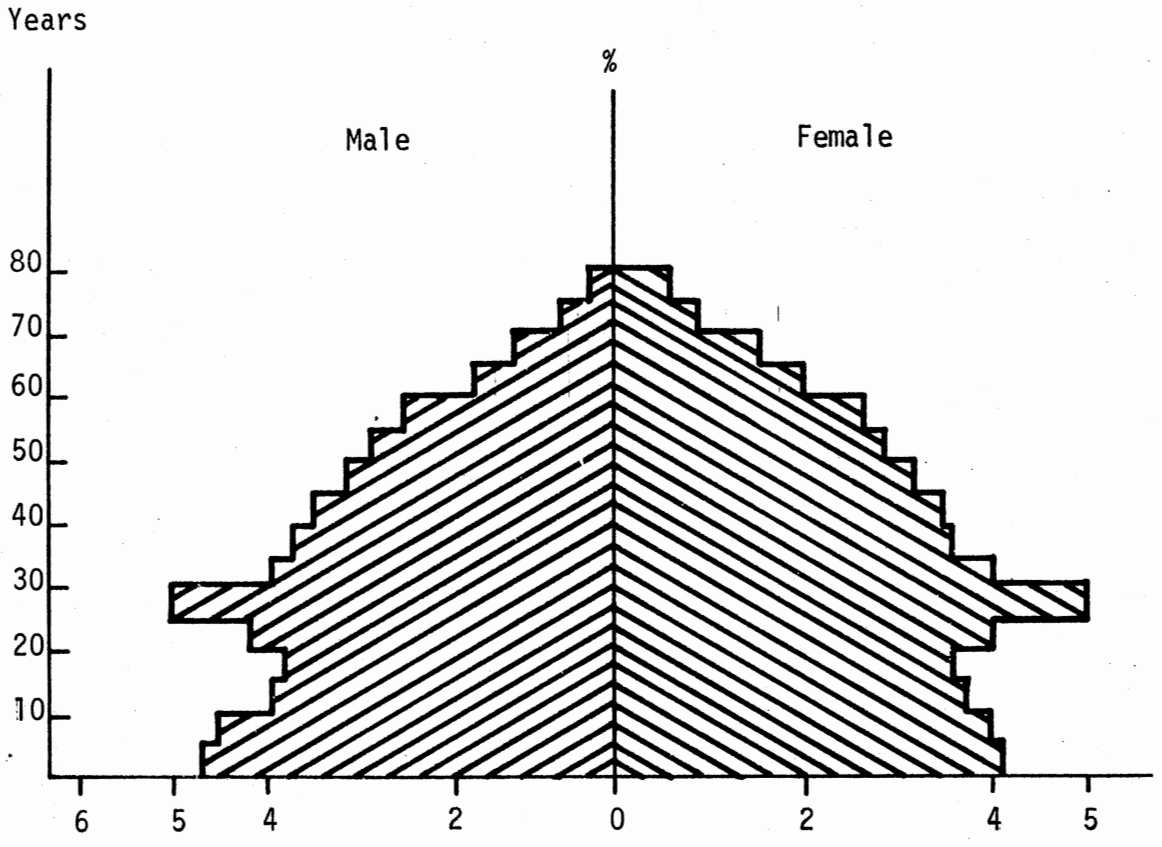
THE CONDITION OF HIGHER EDUCATION IN JAPAN

TABLE XXX

JAPANESE POPULATION BY AGE AND SEX IN 1976
(thousands)

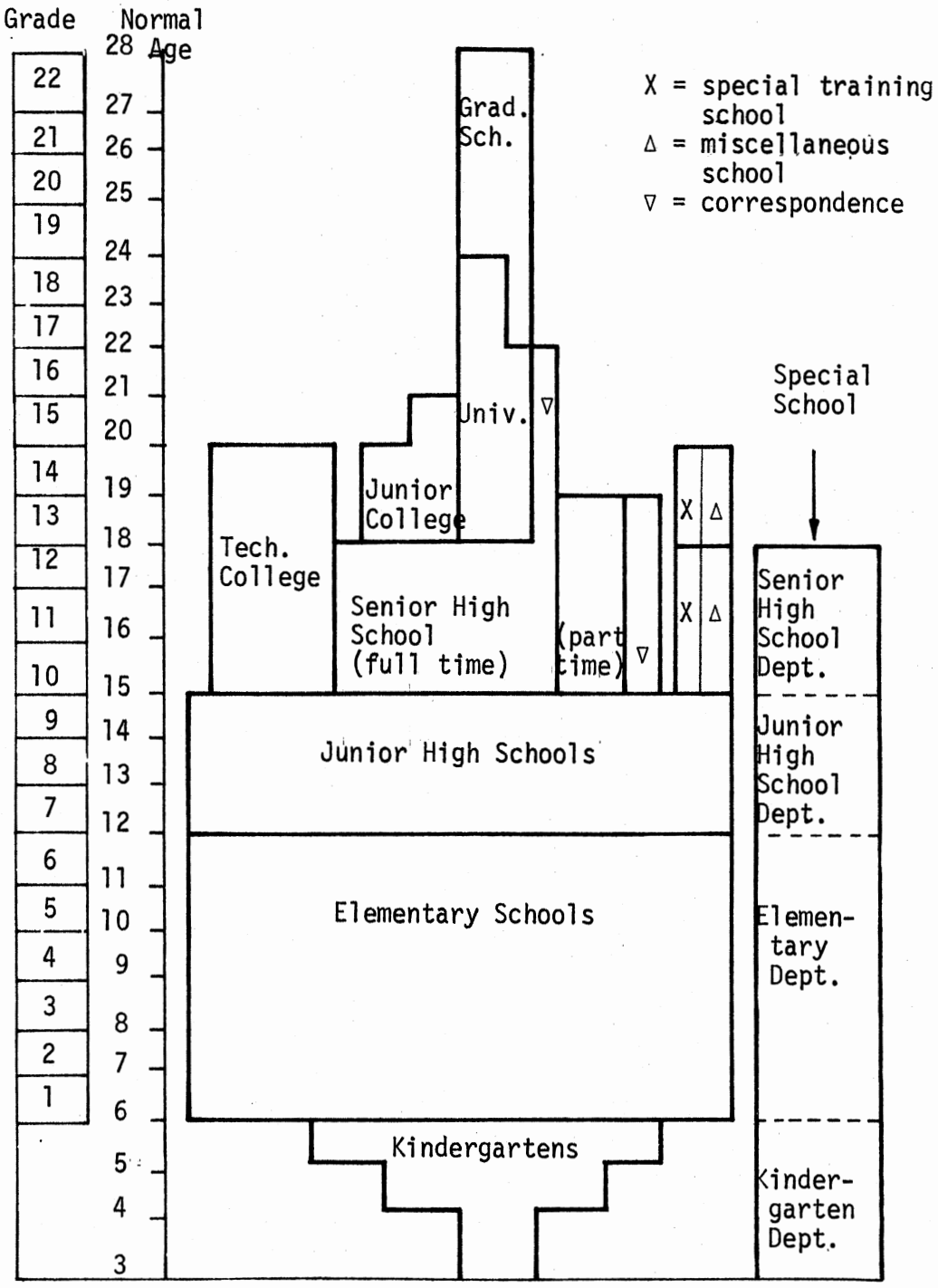
Age	Total	Male	Female	Age	Total	Male	Female
All ages	1,130,860	55,665	57,421	45-49	7,505	3,751	3,754
0- 4	9,843	5,048	4,796	50-54	6,176	2,890	3,305
5- 9	9,465	4,842	4,623	55-59	4,719	2.067	2,652
10-14	8,147	4,147	4,000	60-64	4,344	1,949	2,395
15-19	7,884	4,033	3,851	65-69	3,636	1,633	2,002
20-24	8,645	4,364	4,281	7,074	2,559	1,133	1,426
25-29	11,421	5,751	5,670	7,579	1,723	729	994
30-34	8,792	4,398	4,394	80-84	857	330	527
35-39	8,592	4,302	4,292	85 and	414	131	283
40-44	8,363	4,187	4,176	over			

Source: Bureau of Statistics, Office of the Prime Minister, Statistical Handbook of Japan, p. 108, 1977.



Source: Bureau of Statistics, Office of the Prime Minister, Statistical Handbook of Japan, p. 108.

Figure 4. Population Pyramid of Japan



Source: Bureau of Statistics, Office of the Prime Minister, Statistical Handbook of Japan, p. 126 (1977).

Figure 5. Japanese Education System

TABLE XXXI

STUDENT ENROLLMENT, NUMBER OF GRADUATES, AND NUMBER OF JUNIOR COLLEGES IN JAPAN (1950-1970)

Year	Student Enrollment	Increased Ratio (%)	Number of Graduates	Increased Ratio (%)	Number of Schools
1950	15,098		12,640		149
1955	77,885	516	28,408	210	264
1960	83,457	108	30,401	107	280
1965	147,563	177	55,728	183	369
1970	263,668	194	114,803	206	479
1973	309,360	117	125,593	189	500
1974	330,360	125	130,786	106	505
1975	353,782	114	140,938	105	513
1976	364,880	103	150,863	107	511

Source: Research and Statistics Division and Technical Education Division Higher Education Bureau, Minister's Secretariat, Ministry of Education. Basic Statistical Survey on Schools, p. 557, 1977.

TABLE XXXII

STUDENT ENROLLMENT, NUMBER OF GRADUATES, AND NUMBER OF TECHNICAL COLLEGES IN JAPAN (1965-1976)

Year	Student Enrollment	Increased Ratio (%)	Number of Graduates	Increased Ratio (%)	Number of Schools
1965	22,208		7,465		54
1970	44,314	200	10,318	132	60
1973	48,288	129	9,908	96	63
1974	48,391	104	10,006	110	63
1975	47,955	99	9,540	95	65
1976	47,055	87	9,581	100	55

Source: Research and Statistics Division and Technical Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, p. 567, 1977.

TABLE XXXIII

STUDENT ENROLLMENT, NUMBER OF GRADUATES, AND NUMBER OF COLLEGES AND UNIVERSITIES IN JAPAN (1970-1976)

Year	Student Enrollment	Increased Ratio (%)	Number of Graduates	Increased Ratio (%)	Number of Schools
1950	224,903		1,858		201
1955	523,355	232	94,735	501	228
1960	626,421	140	119,809	126	245
1965	937,556	186	162,349	186	317
1970	1,406,521	188	240,921	148	384
1974	1,659,338	108	300,135	124	410
1975	1,734,082	118	313,072	104	420
1976	1,791,886	103	328,167	104	423

Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, p. 599, 1977 (excluding specialized courses in Medicine and Dentistry).

TABLE XXXIV

STUDENT ENROLLMENT AND NUMBER OF GRADUATES OF GRADUATE SCHOOLS IN JAPAN (1950-1976)

	Masters				Doctors			
Year	Students	Ratio (%)	Graduates	Ratio (%)	Students	Ratio (%)	Graduates	Ratio (%)
1950								
1955	9,037				1,137			
1960	8,305	92			7,429	635		
1965	16,771	202	4,790		11,683	157	2,061	
1970	27,714	115	9,415	197	13,243	92	3,152	153
1974	32,030	116	13,832	147	14,385	109	2,752	87
1975	33,560	105	13,505	98	14,904	104	2,882	105
1976	36,160	108	13,349	99	15,096	105	3,082	107

Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, p. 562, 1977 (excluding specialized courses of Medicine and Dentistry).

TABLE XXXV

STUDENT ENROLLMENT IN COLLEGES AND UNIVERSITIES
BY COURSES OF STUDY (1976)

Course of Study	Student Enrollment	Admitted Students (Freshmen)	Percentage of Freshmen & Enrollment
Total	1,702,235	420,616	
Humanities	223,462	54,325	13
Social Science	707,314	175,639	42
Physical Science	51,543	12,299	3
Engineering	339,713	81,682	20
Agriculture	59,922	14,238	4
Health (Medicine, Dentistry, Pharmacology)	98,253	20,162	6
Merchantile Marine	1,882	361	0.1
Home Economics	30,488	8,049	2
Education	126,259	32,912	7.4
Arts	40,588	10,532	2.4
Others	22,811	10,417	1.3

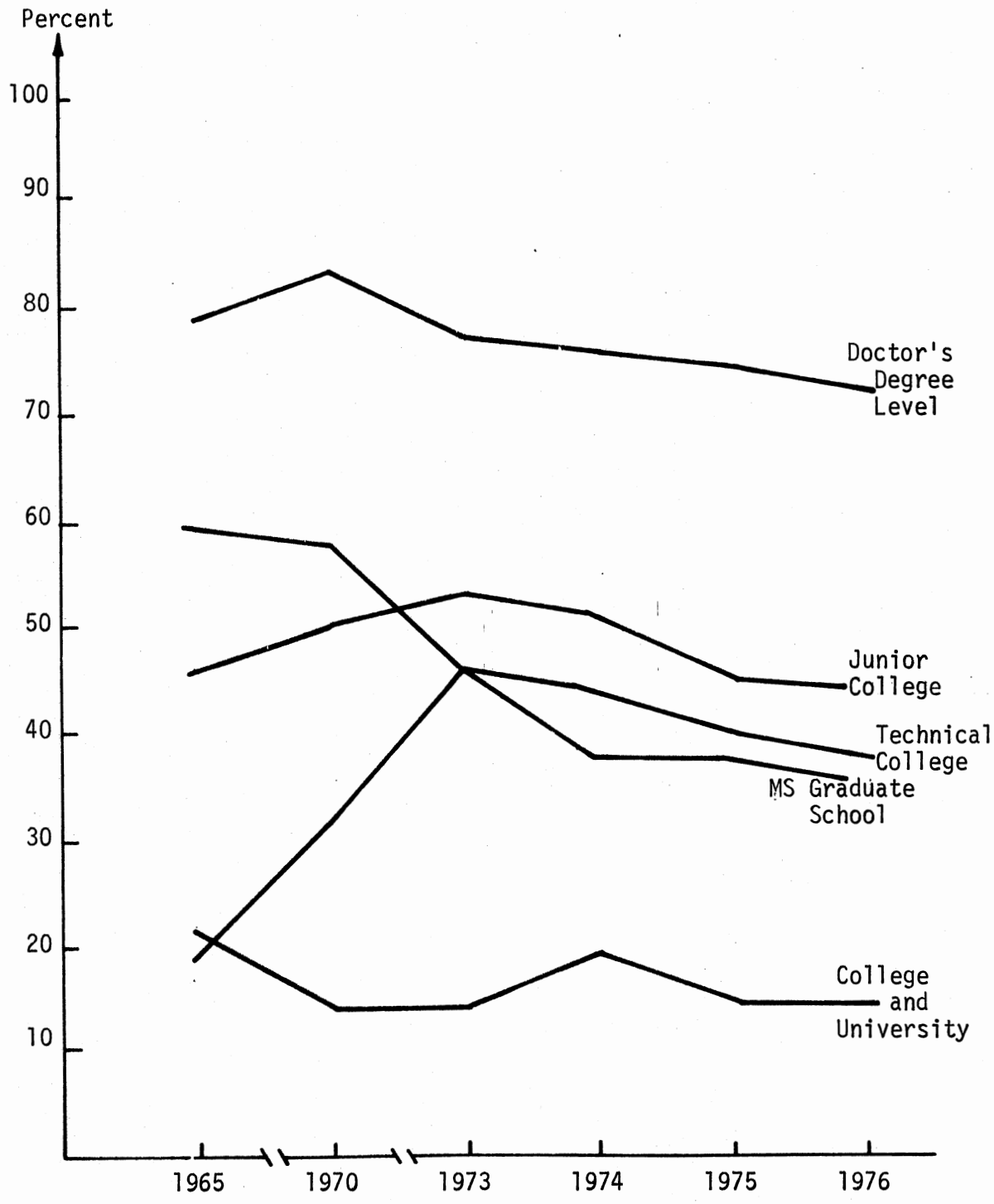
Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, p. 580, 1977.

TABLE XXXVI

PERCENTAGE OF STUDENTS ACCEPTED TO JAPANESE HIGHER EDUCATION (1965-1976)

	Years	1965	1970	1973	1974	1975	1976
Technical College	Number of Applicants	40,803	31,814	20,706	22,178	23,003	24,364
	Number Admitted	7,465	10,318	9,908	10,006	9,540	9,581
	Percentage Admitted	18%	32%	48%	45%	41%	38%
Junior College	Number of Applicants	171,135	252,699	299,565	329,360	379,166	391,669
	Number Admitted	80,563	126,659	154,771	164,077	174,930	174,683
	Percentage Admitted	47%	50%	52%	50%	46%	45%
College & University	Number of Applicants	1,208,546	1,949,338	2,213,625	2,320,113	2,756,699	2,794,518
	Number Admitted	254,524	278,260	338,904	407,528	423,942	420,616
	Percentage Admitted	21%	14%	15%	18%	15%	15%
Graduate School	Number of Applicants M	5,777	14,354	27,669	36,816	40,265	44,364
	Applicants D	2,778	4,225	4,310	15,569	15,634	6,055
	Number Admitted M	3,460	8,341	12,357	14,448	15,770	16,941
	Admitted D	2,223	3,551	3,336	4,182	4,158	4,466
	Percentage Admitted M	60%	58%	45%	39%	39%	38%
	Admitted D	80%	84%	77%	75%	74%	74%
Total	Number of Applicants	1,429,717	2,256,546	2,573,922	2,712,649	3,214,903	3,259,381
	Number Admitted	348,235	427,129	519,276	600,241	628,340	626,287
	Percentage Admitted	24%	19%	20%	22%	20%	19%

Source: Research and Statistics Division and University Education Division Higher Education Bureau, Minster s Secretariat, Ministry of Education, Basic Statistical Survey on Education, pp. 559-580, 1977.



Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Ministries Secretariat, Ministry of Education, Basic Statistical Survey on Education, pp. 558-580 (1977).

Figure 6. Ratio of Student Acceptance to Japanese Junior College, Technical College, College and University, and Graduate School

TABLE XXXVII

GRADUATE STUDENTS BY COURSE OF STUDIES (1976)

Course of Study	Master Courses			Doctoral Courses		
	Students Enrolled	Admitted / Applicants	Percentage of Admission	Students Enrolled	Admitted / Applicants	Percentage of Admission
Total	36,160	16,941 / 44,364	38%	15,696	4,466 / 6,055	74%
Human and Cultural Science	5,951	2,144 / 6,255	34%	2,528	684 / 1,114	61%
Social Science	4,647	1,916 / 7,894	24%	2,235	569 / 1,110	51%
Physical Science	3,519	1,736 / 6,801	26%	2,579	745 / 889	84%
Engineering	15,309	7,875 / 16,084	49%	2,543	774 / 933	83%
Agriculture	3,016	1,546 / 3,261	47%	1,067	297 / 353	84%
Health	1,104	547 / 1,006	51%	4,160	1,233 / 1,446	85%
Merchant Vessels	47	26 / 35	74%	-	-	-
Home Economics	232	99 / 205	48%	15	9 / 12	75%
Physical Education	1,299	583 / 1,505	37%	551	150 / 190	79%
Arts	1,036	409 / 1,198	39%	26	5 / 8	63%

Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, pp. 558-580, 1979.

TABLE XXXVIII

TOTAL NUMBER OF APPLICANTS, ADMISSIONS, ENROLLMENT, AND GRADUATES IN HIGHER EDUCATION IN JAPAN (1965-1976)

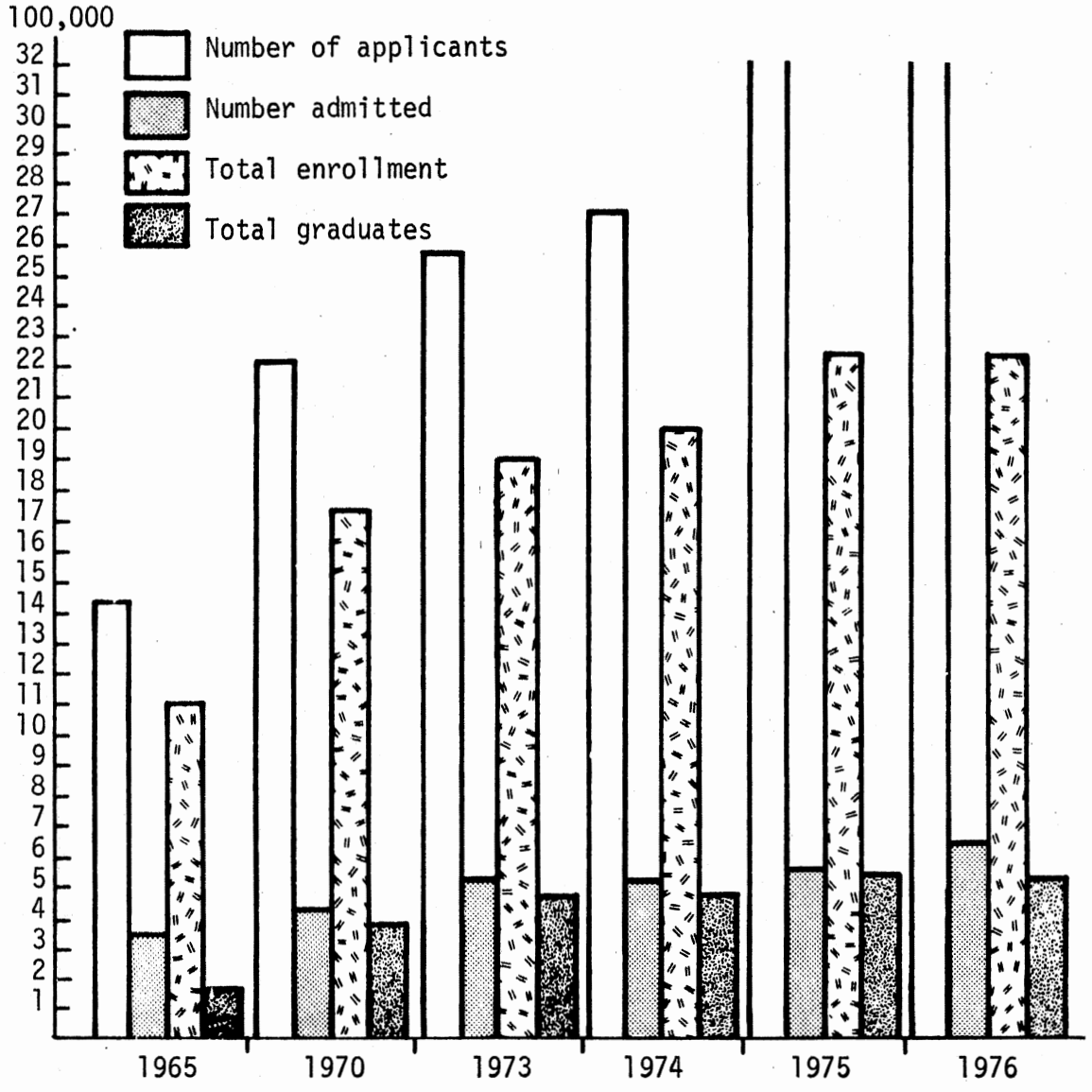
	1965	1970	1973	1974	1975	1976
Number of Applicants	1,429,719	2,256,546	2,573,922	2,712,649	3,214,903	3,259,381
Number of Admissions	348,235	427,129	519,276	600,241	628,340	626,287
Total Enrollment	1,135,780	1,755,460	1,908,047	2,084,504	2,184,283	2,255,577
Graduates	189,855	378,609	459,424	437,511	479,937	503,042

TABLE XXXIX

TOTAL NUMBER OF STUDENT ENROLLMENTS AND GRADUATES OF HIGHER EDUCATION IN JAPAN (1950-1976)

Year		Technical College	Junior College	College and University	Graduate School M	Graduate School D	Total
1950	Total Enrollment	-	15,098	234,923	-	-	250,021
	Graduates	-	12,646	1,858	-	-	14,504
1955	Total Enrollment	-	77,885	523,355	9,037	1,137	611,414
	Graduates	-	28,407	94,735	-	-	123,142
1960	Enrollment	-	83,457	626,421	8,305	7,429	725,612
	Graduates	-	30,401	119,809	-	-	150,210
1965	Enrollment	22,208	147,563	937,555	16,771	11,683	1,135,780
	Graduates	7,465	55,728	119,809	4,792	2,061	189,855
1970	Enrollment	44,314	263,668	1,406,521	27,714	13,234	1,755,460
	Graduates	10,318	114,803	240,921	9,415	3,152	378,609
1973	Enrollment	48,288	309,360	1,506,821	19,716	13,862	1,908,047
	Graduates	9,908	125,593	287,726	11,316	2,481	459,424
1974	Enrollment	68,391	330,360	1,659,338	32,030	14,385	2,084,504
	Graduates	10,006	130,786	300,135	13,832	2,752	457,511
1975	Enrollment	47,955	353,782	1,734,082	33,560	14,904	2,184,283
	Graduates	19,540	140,938	313,072	13,505	2,882	479,937
1976	Enrollment	47,055	314,880	1,791,786	36,160	15,696	2,255,577
	Graduates	9,581	150,863	326,167	13,349	3,082	503,042

Source: Research and Statistics Division and University Education Division, Higher Education Bureau, Minister's Secretariat, Ministry of Education, Basic Statistical Survey on Education, pp. 558-580, 1977.



Source: Research and Statistics Division and University Education Division, Higher Education, Bureau of Ministries Secretariat, Ministry of Education, Basic Statistical Survey on Education, pp. 558-562 (1977).

Figure 7. Ratio of Applicants, Admitted Enrollment, and Number of Graduates of Higher Education in Japan

APPENDIX E

THE UNEMPLOYMENT RATIO OF GRADUATES OF HIGHER EDUCATION IN JAPAN

TABLE XXXX

TOTAL NUMBER OF JAPANESE TECHNICAL COLLEGE GRADUATES, NUMBER OF EMPLOYED AND UNEMPLOYED, AND PERCENTAGE OF UNEMPLOYED FROM 1965 TO 1975

Fiscal Year	Total Graduates	Working	Without Occupation	Percentage of Unemployed
1965	433	432	1	2%
1970	6,282	6,191	91	1%
1973	8,100	7,900	200	3%
1974	8,346	8,289	357	4%
1975	8,578	8,046	532	6%

Source: Bureau of Employment Security, Minstry of Labor, Report on Employment Service, p. 578, 1976. Ministry of Education, School Basic Survey, pp. 368-372, 1976.

TABLE XLI

TOTAL NUMBER OF JAPANESE JUNIOR COLLEGE GRADUATES, NUMBER OF EMPLOYED AND UNEMPLOYED, AND PERCENTAGE OF UNEMPLOYED FROM 1965 TO 1975

Fiscal Year	Total Graduates	Working	Without Occupation	Percentage of Unemployed
1965	55,371	39,382	15,989	29%
1970	117,512	95,582	21,930	19%
1973	130,786	111,871	18,915	15%
1974	140,938	115,891	25,047	18%
1975	150,863	118,928	31,935	23%

Source: Bureau of Employment Security, Ministry of Labor, Report on Employment Service, p. 578, 1976. Ministry of Education, School Basic Survey, pp. 368-372, 1976.

TABLE XLII

TOTAL NUMBER OF JAPANESE COLLEGE AND UNIVERSITY GRADUATES, NUMBER OF EMPLOYED AND UNEMPLOYED, AND PERCENTAGE OF UNEMPLOYED FROM 1965 TO 1975

Fiscal Year	Total Graduates	Working	Without Occupation	Percentage Unemployed
1965	178,279	165,739	12,540	17%
1970	272,949	250,998	21,951	18%
1973	300,135	277,375	22,760	18%
1974	313,072	282,264	30,808	19%
1975	326,167	288,361	37,806	12%

Source: Bureau of Employment Security, Ministry of Labor, Report on Employment Service, p. 578, 1976. Ministry of Education, School Basic Survey, pp. 368-372, 1976.

TABLE XLIII

TOTAL NUMBER OF JAPANESE GRADUATE SCHOOL GRADUATES, NUMBER OF EMPLOYED AND UNEMPLOYED, AND PERCENTAGE OF UNEMPLOYED FROM 1965 TO 1975

Fiscal Year	Total Graduates	Working	Without Occupation	Percentage Unemployed
1965	8,344	7,339	1,005	12%
1970	13,794	12,057	1,737	13%
1973	16,589	14,860	1,729	10%
1974	16,387	14,450	1,937	12%
1975	16,431	13,790	2,641	16%

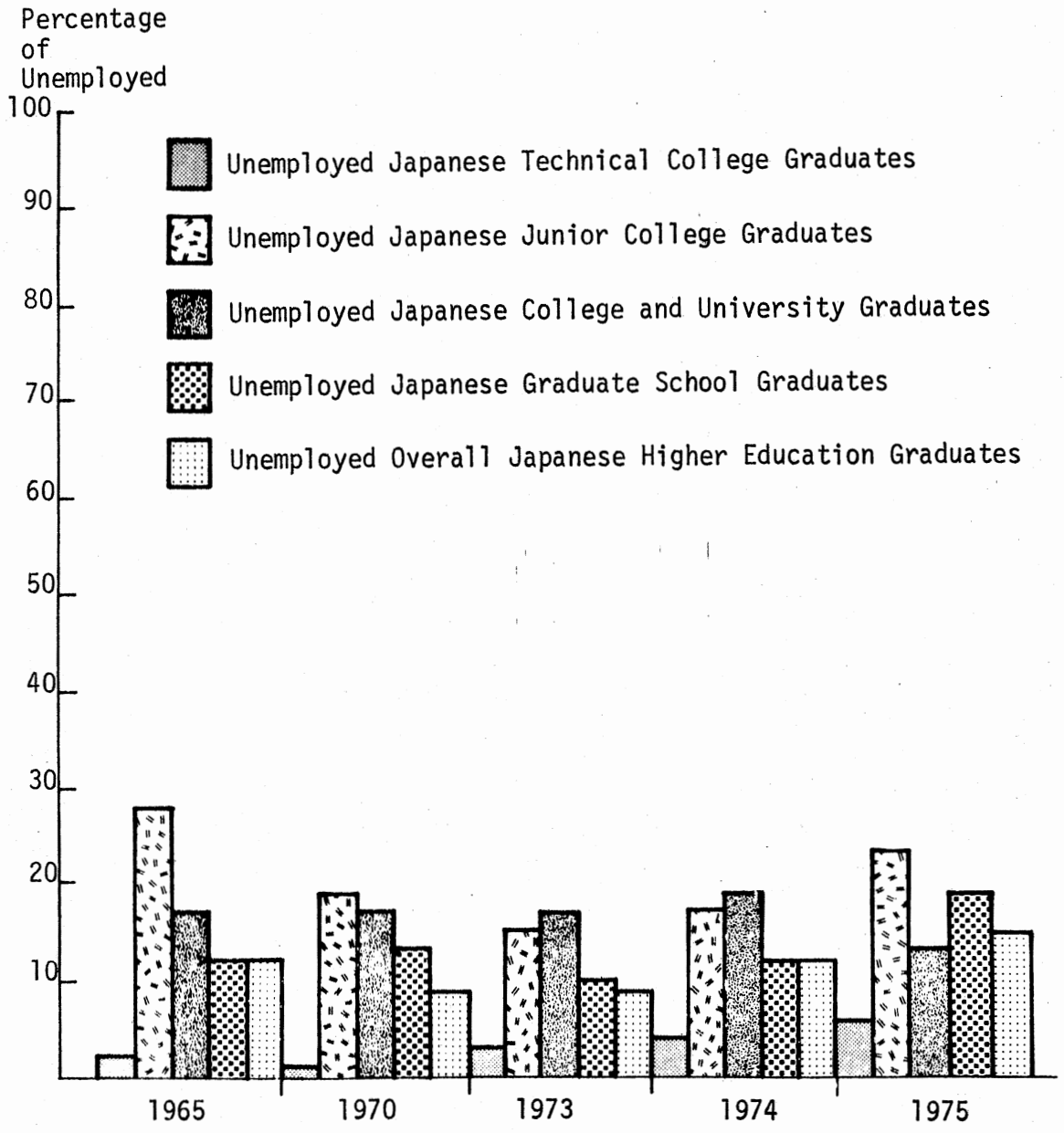
Source: Bureau of Employment Security, Ministry of Labor, Report on Employment Service, p. 578, 1976. Ministry of Education, School Basic Survey, pp. 368-372, 1976.

TABLE XLIV

TOTAL NUMBER OF JAPANESE HIGHER EDUCATION GRADUATES, NUMBER OF EMPLOYED AND UNEMPLOYED, AND PERCENTAGE OF UNEMPLOYED FROM 1965 TO 1975

Fiscal Year	Total Graduates	Working	Without Occupation	Percentage Unemployed
1965	242,427	212,892	29,535	12%
1970	410,537	364,828	47,909	11%
1973	455,613	412,006	43,607	9%
1974	478,743	420,894	57,849	12%
1975	502,039	429,125	72,914	15%

Source: Bureau of Employment Security, Ministry of Labor, Report on Employment Service, p. 578, 1976. Ministry of Education, School Basic Survey, pp. 368-372, 1976.



Source: Bureau of Security, Ministry of Labor, Report on Unemployment Service, p. 578, 1976. Ministry of Education School Basic Survey, pp. 368-372 (1976).

Figure 8. Ratio of Unemployed Among Newly Graduated Individuals From Technical College, Junior College, College and University, and Graduate School

APPENDIX F

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATION USING 1969 DATA FOR THE UNITED STATES AND 1969 TO 1977 DATA FOR JAPAN

TABLE XLV

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION AND YEARS OF EXPERIENCE

		The United States	Japan
	Cons't.	1.1589 (22.026)	1.4389 (18.166)
Education Level	JH	-0.3690 (6.067)	-0.3841 (5.838)
	SH	-0.2755 (4.528)	-0.2766 (4.203)
	JC	0.2110 (3.440)	-0.1127 (1.668)
Experience	10 yrs	0.1377 (2.6301)	-0.8912 (15.532)
	20 yrs	0.0433 (0.817)	-0.4162 (7.525)
R^2		0.241	0.463
N		119	155

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ex_i + e$$

Notes: Notations other than Cons't. and Experience dummies are the same as in Table
1) Cons't. represents wage or salary of those with college degrees and also 30 years of experience.
2) 10 yrs, 20 yrs represent 10 years and 20 years of experience, respectively.

TABLE XLVI

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION

		The United States	Japan
	Cons't	1.1273 (25.178)	0.9976 (8.591)
Education Level	JH	-0.3689 (5.803)	-0.3612 (3.380)
	SH	-0.2769 (4.356)	-0.2765 (2.586)
	JC	-0.2136 (3.331)	-0.1333 (1.032)
R^2		0.241	0.463
N		119	155

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + u$$

Notes: 1) Figures in parentheses are t-ratio.
2) Cons't. represents wage or salary of those with college degree. R^2 = coefficient of determination adjusted for the degree of freedom; N donates sample size.
3) JH, SH, JC represent Junior High School; Senior High School, Junior College graduates.

TABLE XLVII

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, AND THE INTERACTION EFFECTS OF LEVELS OF EDUCATION AND YEARS OF EXPERIENCE

		The United States	Japan
	Cons't.	1.2030 (15.973)	1.4982 (15.635)
Education Level	JH	-0.4328 (4.064)	-0.6860 (5.471)
	SH	-0.3533 (3.395)	-0.3003 (2.711)
	JC	-0.2427 (2.378)	-0.1016 (0.883)
Experience	10 yrs	-0.2764 (2.595)	-1.0302 (9.139)
	20 yrs	0.0497 (0.466)	-0.4636 (4.113)
Interaction Effects	JH 10 yrs	0.2010 (1.335)	0.4316 (2.699)
	JH 20 yrs	-0.0094 (0.062)	0.2534 (1.617)
	SH 10 yrs	0.2126 (1.428)	0.1107 (0.7071)
	SH 20 yrs	0.0236 (0.156)	-0.0469 (0.293)
	JC 10 yrs	0.1380 (0.916)	0.0051 (0.031)
	JC 20 yrs	-0.0458 (0.300)	-0.0389 (0.239)
R^2		0.339	0.814
N		119	115

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_i + b_2 \sum_{i=1}^{2} Ed_i + b_3 \sum_{i=1}^{3} Ed_i Ex_i + u$$

Notes: Notations other than Cons't. and Interaction effects, dummies are the same as in Table XXIII.

1) Cons't. represents wage or salary of those with college degrees, 30 years experience, and also includes the interaction effect of education and years of experience.

2) JH and 10 yrs represents Junior High School degree and 10 years of experience. JH and 20 yrs represents Junior High School and 20 years of experience. SH and 10 yrs represents Senior High School and 10 years of experience. SH and 20 yrs represents Senior High School and 20 yrs of experience. JC and 10 yrs represents Junior College and 10 yrs of experience. JC and 20 yrs represents Junior College and 20 yrs of experience.

TABLE XLVIII

REGRESSION RESULTS OF AGGREGATE EARNINGS EQUATIONS WITH RESPECT TO THE DIFFERENT LEVELS OF EDUCATION, YEARS OF EXPERIENCE, THE INTERACTION EFFECT OF LEVELS OF EDUCATION AND YEARS OF EXPERIENCE AND SECTOR OF INDUSTRIES

		The United States	Japan
	Cons't.	1.2637 (17.953)	1.3749 (10.343)
Education Level	JH	-0.4328 (4.528)	-0.5991 (5.782)
	SH	-0.3564 (3.815)	-0.296 (2.854)
	JC	-0.2427 (2.538)	-0.1068 (0.992)
Experience	10 yrs	-0.2764 (2.892)	-1.030 (9.770)
	20 yrs	0.0497 (0.519)	-0.465 (4.399)
Interaction Effects	JH 10 yrs	-0.2010 (1.487)	0.4167 (2.786)
	JH 20 yrs	-0.0094 (0.070)	0.2410 (1.642)
	SH 10 yrs	0.2159 (1.615)	0.1134 (0.774)
	SH 20 yrs	0.0307 (0.227)	-0.0411 (0.274)
	JC 10 yrs	0.1380 (1.021)	0.0019 (0.012)
	JC 20 yrs	-0.0391 (0.285)	-0.0374 (0.245)
Sector of Industry	Primary	-0.265 (5.134)	0.0193 (0.191)
	Secondary	-0.0250 (0.554)	0.2212 (2.191)
R^2		0.478	0.840
N		119	155

$$Y = b_0 + b_1 \sum_{i=1}^{3} Ed_2 + b_2 \sum_{i=1}^{2} Ex_1 + b_3 \sum_{i=1}^{3} Ed_i Ex_i + b_4 \sum_{i=1}^{2} Sec_i + W$$

Notes: Notations other than Cons't. and Sector of Industry dummies are the same as in Table XXIV.

1) Cons't. represents wage or salary of those with college degrees, 30 years of experience, and also include th interaction effect and holding a job in tertiary industry.

2) Primary indicates primary in industry, which originally includes agriculture, forestry, and pastoral producer, in some versions, as mining.
Secondary indicates secondary industry, such as manufacturing, generally including mining, and as a rule, construction.

VITA[2]

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